



US Army Corps  
of Engineers  
Rock Island District

DES MOINES RECREATIONAL  
RIVER AND GREENBELT

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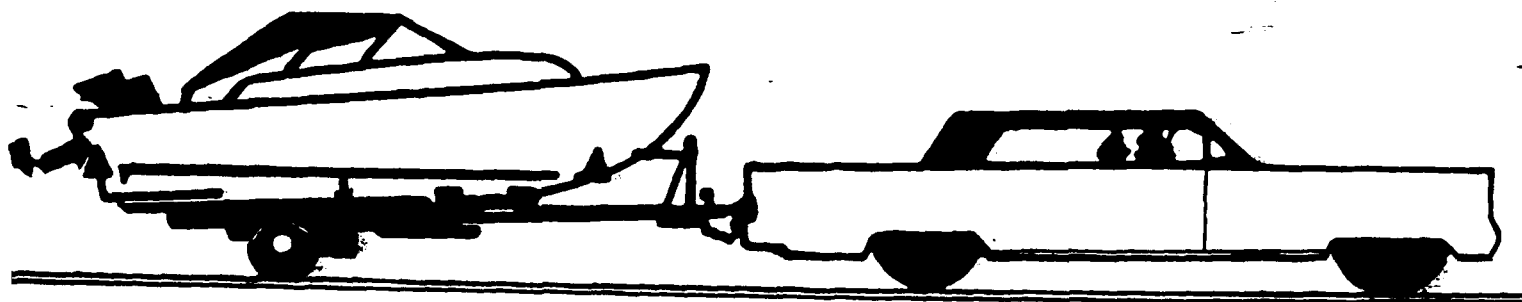
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OPERATION AND MAINTENANCE MANUAL

BENNINGTON BRIDGE  
BOAT RAMP



OCTOBER 1991

REVISED DEC 199

STATEMENT A

Approved for public release;  
Distribution Unlimited

92-13927



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REPLY TO  
ATTENTION OF:

DEPARTMENT OF THE ARMY  
ROCK ISLAND DISTRICT, CORPS OF ENGINEERS  
CLOCK TOWER BUILDING—P.O. BOX 2004  
ROCK ISLAND, ILLINOIS 61204-2004

January 2, 1992

Engineering Division  
General Engineering Section

SEE REPORT DISTRIBUTION LIST (APPENDIX C)

Please find enclosed the final approved Operation and Maintenance Manual for the Bennington Bridge Boat Ramp, Des Moines Recreational River and Greenbelt, Des Moines River, Marion County, Iowa.

The annual inspection of this completed work will be a joint inspection between the Corps of Engineers (COE) and the Iowa Department of Natural Resources (IDNR). Points-of-contact are as follows:

- a. COE: Ms. Donna Jones, CENCOR-OD-SI, (309) 788-6361, extension 6371. [Coordinator and office of inspection files.]
- b. COE: Mr. Gerald Dowell, CENCOR-OD-RR, (515) 828-7522. [Lake Red Rock staff will perform the inspection with IDNR.]
- c. IDNR: Mr. Jim Zohrer, (515) 281-5145.

Questions regarding this document should be directed to Mr. Perry Hubert, Project Engineer, telephone (309) 788-6361, extension 6554.

Sincerely,

  
Robert W. Kelley, P.E.  
Chief, Engineering Division

Enclosure



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DEPARTMENT OF THE ARMY  
NORTH CENTRAL DIVISION, CORPS OF ENGINEERS  
111 NORTH CANAL STREET  
CHICAGO, ILLINOIS 60606-7206

REPLY TO  
ATTENTION OF:

DEC 16 1991

CENCD-CO-MO (5)

MEMORANDUM FOR Commander, Rock Island District,  
ATTN: CENCR-ED-DG/Hubert

SUBJECT: O & M Manual, Bennington Bridge Boat Ramp

1. The O & M Manual is approved with the provision that the year 1989 in the second line of paragraph 2.a.(1) on page 2 is corrected to 1985. We believe that the proper date for PL 99-88 is 15 Aug 1985, not 1989.
2. Two copies of the final O & M manual are to be furnished to this office, ATTN: CENCD-CO-O.
3. The HQ, NCD, POC is C. Reuter at (312) 353-6375.

FOR THE COMMANDER:

ROBERT A. NEAL, P. E.  
Deputy Director, Directorate of  
Construction and Operations

OPERATIONS AND MAINTENANCE MANUAL  
DES MOINES RECREATIONAL RIVER AND GREENBELT  
BENNINGTON BRIDGE  
BOAT RAMP  
MARION COUNTY, IOWA

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OPERATION AND MAINTENANCE MANUAL  
DES MOINES RECREATION RIVER AND GREENBELT  
BENNINGTON BRIDGE  
BOAT RAMP  
MARION COUNTY, IOWA

SECTION 1

INTRODUCTION

a. Purpose and Scope.

(1) This manual has been prepared to serve as a guide for the operation and maintenance of the Bennington Bridge Boat Ramp. Operations and maintenance instructions for the major features of the project are presented. This manual has been written for project and management personnel familiar with the project and does not contain detailed information which is common to site personnel or which is presented in other existing manuals or regulations.

(2) The intent of the operating instructions is to provide information which allows orderly and efficient use of the constructed features. The intent of the maintenance instructions is to present preventative maintenance information consisting of systematic inspections and subsequent corrective actions which should ensure long-term utilization of equipment and features. A timely preventative maintenance program reduces and virtually eliminates breakdown of essential equipment and prevents major damage to constructed features by early corrective action.

(3) This manual provides the general standards of maintenance and establishes an initial frequency of maintenance inspections which should ensure satisfactory project performance. Deviation from the inspection frequencies is permissible as conditions warrant based on experience at the project and similar equipment at comparable projects.

b. Use of Manual

(1) This manual is divided into the following sections: Section 2: Historical Summary; Section 3: Description of Project Features; Section 4: Inspections; Section 5: Operation and Maintenance of Project Features; and Section 6: Performance Monitoring and Assessment. Sections 2 and 3 present historical summaries and descriptions of actual features constructed for this project. Section 4 presents project inspection procedures and Section 5 presents operation and maintenance instructions for the project features.

(2) The attached drawings comprise the complete set of as-built plans.

## SECTION 2

### HISTORICAL SUMMARY

#### a. Authorization and Location.

(1) The Des Moines Recreational River and Greenbelt (hereinafter) referred to as the Greenbelt) was authorized on August 15, 1985, by Public Law 99-88, the 1985 Supplemental Appropriations Act. Additional Greenbelt legislation is contained in Section 102 of Public Law 99-500, Fiscal Year 1987 Continuing Resolution Act, and Section 604 of Public Law 99-662, the Water Resources Development Act of 1986.

(2) The project is located on the Des Moines River five miles Southeast of Runnels, Marion County, Iowa. This area is a part of the Red Rock Reservoir Project lands leased to the State of Iowa for management and enhancement of fish and wildlife.

#### b. Planning and Construction Activities.

(1) The project was designed by the Rock Island District, Corps of Engineers in conjunction with the Iowa Conservation Commission. The construction contract was supervised by the Corps of Engineers, Rock Island District.

c. Actual Project Costs. The actual cost of the project is presented in Table 2-1 with a summary of cost apportionment presented in Table 2.2.

TABLE 2-1

#### ACTUAL PROJECT COSTS

<u>Item</u>	<u>Description</u>	<u>Actual Quantity</u>	<u>Unit</u>	<u>Unit Cost (\$)</u>	<u>Total (\$)</u>
1	Clearing and Grubbing	1.00	JOB	1000.00	1000.00
2	Deleted				0.00
3	Fill	3458.50	CY	1.95	6744.08
4	Culvert, 24" CMP w/Aprons	52.50	LF	42.39	2225.48
5	Stone Protection, Bedding	275.17	TON	14.00	3852.38
6	Stone Protection, Riprap	444.55	TON	16.15	7179.48
7	Granular Surfacing	1047.07	TON	14.15	14816.04
8	Seeding	1.60	ACRE	900.00	1440.00
9	Stone Base Course	107.71	TON	14.75	1388.72
10	Rock Fill	942.44	TON	16.10	15173.28
11	Concrete Ramp	243.33	SY	32.00	7786.56
12	Remove and Reinstall Existing Culvert and Aprons	1.00	JOB	1283.00	1283.00 0.00
13	Wheel Stops	18.00	EA	39.00	702.00
14	Repair of Flood Damage to Boat Ramp	1.00	JOB	5221.91	5221.91 0.00

15	Construct Drainage Ditch	1.00	JOB	718.33	<u>718.33</u>
Total Construction Contract Cost					69,731.26
16.	Iowa Tax Credit				<u>-995.66</u>
TOTAL RECREATION FACILITIES					68,735.60

TABLE 2-2

SUMMARY OF COST APPORTIONMENT

	<u>State</u>	<u>Federal</u>
Construction	\$1,900.00	\$68,735.60
Engineering and Design	2,200.00	6,964.55
Supervision and Administration	<u>1,000.00</u>	<u>8,468.71</u>
Subtotal	\$5,100.00	\$84,168.86
 TOTAL PROJECT COST		 \$89,268.86
 STATE SHARE (50%)		 44,634.43
STATE CREDITS (FROM SUBTOTAL ABOVE)		<u>-5,100.00</u>
STATE CONTRIBUTED FUNDS		\$39,534.43
FEDERAL SHARE (50%)		\$44,634.43

d. Project References. Table 2-3 provides a summary of related project references.

TABLE 2-3

PROJECT REFERENCES

<u>Title</u>	<u>Date</u>	<u>Purpose</u>
Bennington Boat Ramp Specifications	Aug 86	Provide material standards and methods of construction.
Local Cooperation Agreement (LCA)	26 Jun 86	Provides cost-sharing requirements between the Department of the Army and the State of Iowa.
Construction As-Builts	7 Aug 86	Provides as-built construction drawings.



### SECTION 3

#### DESCRIPTION OF PROJECT FEATURES

##### a. Project Description.

Description: The project consists of an upgraded parking facility and a new boat ramp with access road and turnaround.

##### b. Project Features.

(1) Grassed Slopes and Drainage Areas: A ditch and terrace, a V-ditch, a ditch dike, and a 24" corrugated metal pipe culvert were constructed to divert runoff from the existing parking lot. The slope north of the parking lot was graded and seeded.

(2) Access Road, Parking Lot, and Turnaround: The existing granular surfaced access road alignment was followed south to the parking lot where approximately 75 feet of new access road was constructed. A new 100 ft. diameter turnaround was constructed south of the new access road. The turnaround was elevated above the existing ground surface and covered with 6 in. of new granular surfacing. Six inches of new granular surfacing was added to the new and existing access roads, the parking lot, and the turnaround. Eighteen new concrete wheel stops were added to the parking lot.

(3) Boat Ramp: The new 125 ft. boat ramp features a 7 1/2 in. reinforced concrete slab over a 6 in. stone base course and a 24 in. layer of new riprap on both sides and at the toe.

(4) Stone Protection: Over 700 tons of bedding and riprap protection material was added adjacent to the boatramp.

### SECTION 4

#### INSPECTIONS

##### a. General.

(1) An active maintenance program is based on inspections and subsequent servicing, adjustment, or repair. The objective of inspections is to obtain a balance between inspection costs and the cost of repairs and replacements that could be avoided by timely and thorough inspections.

(2) There are 2 types of inspections for the project: (1) Project Inspection by the Site Manager and (2) Joint Inspection by the Site Manager and personnel from the Corps of Engineers, Rock Island District.

b. Project Inspections by Site Manager.

(1) The Project Inspection should be performed by the Site Manager or appropriate representative for the purpose of noting routine deficiencies and initiating corrective actions. This inspection should be performed at periods not exceeding 12 months and should follow inspection guidance presented in subsequent sections of this manual. Other Project Inspections should occur as necessary or as scheduled by the Site Manager.

(2) A Project Inspection checklist has been developed as presented in Appendix B. It is suggested that a copy of the completed checklist be furnished to the Corps of Engineers, Rock Island District, ATTN: CENCR-OD-SI, P.O. Box 2004, Rock Island, Illinois 61204-2004, immediately following each annual Project Inspection by the Site Manager.

c. Joint Inspections by Site Manager and Corps of Engineers.

A Joint Inspection by the Site Manager and the Corps of Engineers will be scheduled annually by the Corps in accordance with ER 1165-2-131. The purpose of this inspection is to assure that adequate maintenance is being performed as required by the LCA and this manual. The District Engineer or Authorized Representatives should have access to all portions of the constructed project upon coordination with the Site Manager for this purpose. Copies of this inspection will be furnished to the Site Manager stating project maintenance conditions. Corrective actions from these inspections should be accomplished by the Site Manager as provided by the LCA, reference appendix A.

## SECTION 5

### OPERATION AND MAINTENANCE OF PROJECT FEATURES

a. General.

(1) This section presents operation and maintenance instructions for the major project features which were designed and constructed to minimize operation and maintenance requirements.

(2) Project features should be continuously maintained and operated to obtain maximum benefits. No encroachment or trespass which will adversely affect the efficient operation or maintenance of the project should be permitted upon the constructed features. No improvement should be passed over, under, or through the constructed features, nor should any excavation or construction be permitted within these features without prior approval by the Corps of Engineers, Rock Island District. Such improvements or alterations which are desirable and permissible should be constructed in accordance with standard engineering practice. Advice regarding the effect of proposed improvements or alterations on the functioning of the project and information concerning methods of construction acceptable under standard engineering practice should be obtained from the District Engineer or if otherwise

obtained, should be submitted for approval. Drawings or prints showing improvements or alterations as finally constructed should be furnished to the District Engineer after completion of such work.

b. Access Road, Parking Lot, and Turnaround.

(1) Operation.

(a) During the course of normal operations , visual inspections will be made of all irregularities, such as slides, settlement, rutting, potholes, washouts, damage to signs, culverts, and other hazardous conditions. During or following heavy rains or storms, inspect for flooding, washouts, settlements, slides, fallen trees, and other obstructions. Dangerous conditions should be corrected immediately.

(2) Maintenance.

(a) Make thorough inspections for above conditions on the road, parking lot and turnaround. Clean up and repair as required to maintain in good condition. Add additional granular material as required.

c. Grassed Slopes and Drainage Areas.

(1) Operation.

(a) Twice each year, before and after growing seasons, all slopes and grassed areas will be inspected for erosion damage. Materials will be stored to anticipate any future maintenance requirements, such as gully repair, fertilization, weed and brush control, and watering operations.

(2) Maintenance

(a) Apply fertilizer, till, reseed, resprig, and water areas where there is little or no grass. Maintenance watering of critical slopes may be required to hasten the grass cover.

(b) Weeds will be controlled by either chemical methods or by mowing, when necessary, on all planted areas. During the growing season, two or more mowings or chemical herbicide treatments are usually required for effective weed control. Unless there is a weed problem, mowing of the planted areas will be deferred until the grass has matured.

(c) The inlet and outlet of the 24" CMP culvert should be kept clear of sediment or debris which may decrease hydraulic capacity.

d. Boat Ramp.

(1) Operation.

(a) Visual inspections will be made during the course of normal operations, semiannually, and after periods of unusually high water or waves, to determine if riprap or crushed rock has been displaced or the ramp has been undermined.

(b) During the course of normal operations and once each year an inspection will be made for signs of spalling of concrete at expansion and contraction joints.

(2) Maintenance.

(a) Repairs to the bedding and riprap adjacent to the boatramp should be made by adding gravel blanket or crushed stone, if necessary, to maintain the required depth under the riprap.

(b) Any foreign materials such as stones, dirt, branches, etc. will be removed from the boatramp and surrounding areas. Contraction joints will be cleaned and damaged concrete repaired. Joint filler will be replaced as required.

e. Stone Protection

(1) Operation.

(a) Visual inspections will be made during the course of normal operations, semiannually, and after periods of unusually high water or waves, to determine if riprap or bedding has been displaced or undermined.

(b) The riprap will be checked for significant deterioration which might have been caused by freeze-thaw cycles. Deteriorated riprap should be replaced to maintain the design gradation and depth.

(c) All areas of stone protection will be checked for woody vegetation. Any woody vegetation should be removed. Chemical herbicide treatments may be required if woody vegetation is wide spread.

APPENDIX A  
LOCAL COOPERATION AGREEMENT

AGREEMENT BETWEEN  
THE DEPARTMENT OF THE ARMY  
AND  
THE STATE OF IOWA  
FOR RECREATION DEVELOPMENT  
AT BENNINGTON BRIDGE RIVER ACCESS  
DES MOINES RIVER  
MARION COUNTY, IOWA

THIS AGREEMENT, entered into this 26<sup>th</sup> day of June, 1986, by and between THE DEPARTMENT OF THE ARMY (hereinafter called the "Government"), represented by the Assistant Secretary of the Army (Civil Works), and the STATE OF IOWA (hereinafter called the "State"), acting by and through the State Conservation Commission,

WITNESSETH, that

WHEREAS, under Public Law 99-88, the Supplemental Appropriations Act of 1985, the Secretary of the Army, acting through the Chief of Engineers, is authorized to proceed with planning, design, engineering and construction of the Des Moines Recreational River and Greenbelt, Iowa, Project as reflected in the Joint Explanatory Statement of the Committee of Conference accompanying the Conference Report for H. R. 2577; and

WHEREAS, the Joint Explanatory Statement accompanying the Conference Report for H. R. 2577 states, in part, that said Project shall include "such ... wildlife protection and development and other activities that will enhance the natural environment for recreational purposes..."; and

WHEREAS, on 8 May 1967 the Government and the Iowa State Conservation Commission entered into License Contract No. DACW25-3-67-142, as amended, (hereinafter called the "License"), whereby the Government authorized the State to use approximately 25,000 acres of Government-owned lands in the Red

Rock Reservoir Project for management and enhancement of fish and wildlife and for related environmental purposes; and

WHEREAS, construction of the Bennington Bridge River Access Project on the Des Moines River (hereinafter referred to as the "Bennington Project") consists of a 130-foot concrete boat ramp and approximately 40,000 sq. ft. of adjacent roadway and parking area surfaced with 4 inches of crushed stone; and

WHEREAS, the approximately 1.5 acres of land (hereinafter referred to as the "licensed lands") needed for the Bennington Project are located within the Government-owned lands covered by the License; and

WHEREAS, the parties hereto agree to extend at least that portion of said License which includes the 1.5 acres of licensed lands for consecutive terms of 25 years each for the life of the Bennington Project; and

WHEREAS, under Public Law 99-88, this Project may be undertaken and funds expended under terms and conditions acceptable to the Secretary of the Army (or under terms and conditions provided for in subsequent legislation when enacted into law) as set forth in this binding Agreement; and

WHEREAS, the State and the Government mutually desire to enter into a cost-sharing agreement for construction of the Bennington Project on said licensed lands for the purpose of enhancing the natural environment for recreational purposes:

NOW THEREFORE, in consideration of the foregoing and the benefits which shall accrue to the parties by construction of the Project, the parties agree as follows:

#### ARTICLE I - DEFINITIONS

a. The term "total project costs" shall mean all costs incurred by the State and the Government directly related to construction of the project

(excluding costs for betterments, operation and maintenance, and replacement of facilities). Such total project costs shall include, but not necessarily be limited to, actual construction costs, the value of any lands, easements, and rights-of-way (exclusive of the licensed lands), relocation and alteration costs, costs of applicable engineering and design, continuing planning and engineering costs incurred after October 1, 1985, and supervision and administration costs.

b. The "Contracting Officer" shall be the Commander of the U.S. Army Corps of Engineers District, Rock Island, Illinois, or his designee.

## ARTICLE II - OBLIGATIONS OF PARTIES

a. As further specified in Article VI, the State shall provide, prior to advertisement of the construction contract, an amount equal to 50 percent of the total estimated project costs. The amount to be provided shall include any lands, easements, and rights-of-way and utility and facility alterations and relocations required for construction of the project, as well as a cash payment or approved services equal in value to the difference between the value of the above items (exclusive of the licensed lands), as determined pursuant to Article IV of this Agreement, and 50 percent of the total project costs.

b. The Government, using funds provided by the State and appropriated by the Congress, shall expeditiously construct the Project, applying those procedures usually followed or applied in Federal projects, pursuant to Federal laws, regulations, and policies. Award of the contract and performance of the work thereunder shall be exclusively within the control of the Government. At the sole discretion of the Government, the State may be permitted to perform engineering and design services on portions of the Project and construct portions of the Project subject to Government audit.

c. Upon completion of project construction, the Government shall turn the project over to the State, which shall be solely responsible for



operation, maintenance and rehabilitation, without cost to the Government, of all facilities developed under this agreement, in accordance with regulations or directions prescribed by the Government, including but not limited to the conditions of the License.

d. Initiation of construction is contingent upon the appropriation by the Iowa State Legislature of funds sufficient to meet the State's share of total project costs. Once construction has been initiated, the State is fully obligated to perform its duties as set forth in this Agreement.

### ARTICLE III - LANDS, FACILITIES, AND RELOCATION ASSISTANCE

a. The State will provide all lands, easements, and rights-of-way, including suitable borrow and dredged material disposal areas, as may be determined by the Chief of Engineers to be necessary for construction, operation, maintenance, and rehabilitation of facilities developed for the project. Prior to issuance of the invitation for bids on the Project, the State shall furnish to the Government rights-of-entry to lands, easements and rights-of-way required for the project, together with evidence supporting the State's legal authority to grant such rights-of-entry.

b. The State shall accomplish all alterations and relocations of buildings, streets, storm drains, utilities, highway bridges, and other structures and improvements made necessary by construction of the project.

c. The State shall comply with the applicable provisions of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, Public Law 91-646, approved January 2, 1971, in acquiring any additional lands, easements, and rights-of-way, exclusive of the licensed lands, for construction and subsequent operation, maintenance and rehabilitation of the project, and inform all affected persons of applicable benefits, policies, and procedures in connection with said Act.

#### ARTICLE IV - VALUATION OF LANDS AND FACILITIES

a. The parties hereto agree that all lands, easements and rights-of-way needed for the project which are within the licensed lands are available for construction, operation and maintenance of the project, and that no credit shall be given either the State or the Government for value of any of the said licensed lands and that this Article refers to any additional lands which may be provided by the State for the Project.

b. No land or interest therein not already owned by the Government may be acquired for the Project without the consent of the owner.

c. For purposes of determining total project costs and the State's share thereof, the value of lands, easements, and rights-of-way, exclusive of the licensed lands, which are provided by the State for the project shall be determined as follows:

(1) Credit for any additional lands, easements and rights-of-way provided by the State will be the fair market value of the lands at the time such lands are made available to the Government for construction of the Project, (provided that such credit shall not be more than the original cost paid by the State for such land or interest therein) together with the actual and reasonable costs of acquiring the lands, e.g., title and closing costs, as well as the actual amounts expended for any relocation assistance made in accordance with Article III.e. The fair market value shall be determined by an appraisal to be obtained by the State which has been prepared by an independent and qualified appraiser who is acceptable to both the State and the Government. The appraisal shall be reviewed and approved by the Government.

(2) If the State acquires more lands, easements, or rights-of-way, or greater interests therein, than are necessary for Project purposes as determined by the Government, then only the costs of such portions of, or interests in, those acquisitions deemed necessary by the Government for project purposes shall be included in total project costs.

d. For purposes of determining total project costs and the State's share thereof, the cost of alteration or relocation of any utilities or facilities shall be that portion of the actual cost incurred by the State as set forth below:

(1) Bridges and highways: Only that portion of the cost as would be necessary to construct substitute bridges and roads to the design standard that the State of Iowa would use in constructing a new bridge or road under similar conditions of geography and traffic loads.

(2) Utility Facilities: Actual relocation costs, less depreciation, less salvage value, plus the cost of removal, less the cost of betterments. With respect to betterments, new materials shall not be used in any relocation or alteration if materials of value and usability equal to those in the existing facility are available or can be obtained as salvage from the existing facility or otherwise, unless the provision of new material is more economical. If, despite the availability of used material, new material is used, where the use of such new material represents an additional cost, such cost will not be included in total project costs.

e. Principles for determining allowable cost of contracts and subcontracts with State, local, and federally recognized Indian tribal governments are set forth in Office of Management and Budget (OMB) Circular No. A-87, Cost Principles for State and Local Governments, Revised. Those cost principles shall be applied during audit to determine allowability, allocability and reasonableness of costs incurred and claimed by the Local Sponsor as a part of total project costs. Costs shall be deemed allowable and includable as project costs to the extent they are incurred in accordance with and are in compliance with the principles enunciated in OMB Circular A-87 and are not excluded by the terms of this Agreement. For purposes of determining total project costs and the State's share thereof, the cost of construction and engineering and design services that may be furnished by the State pursuant to this Agreement shall be that portion of these actual costs as set forth below:

1. Actual construction costs incurred by the State in constructing all or portions of the Project, less salvage value, and less the cost of betterments.

2. Actual expenses directly incurred and auditable in providing engineering and design services and expenses directly incurred and auditable in supervision and administration of construction contracts. For any expenses of the State incurred after the date of this Agreement to qualify for reimbursement as a contribution to project costs, all local expenditures for construction and engineering and design must be approved in advance by the Contracting Officer and will be subject to final Government audit. "Overhead" or other "indirect" expenditures by the State not relating directly to performance of the Project shall not be allowed as a project cost.

#### ARTICLE V - PROJECT PHASING AND MANAGEMENT

a. To provide for consistent and effective communication between the State and the Government during the term of construction, the State and the Government shall appoint representatives to coordinate on scheduling, plans, specifications, modifications, contract costs, and other matters relating to construction of the project.

b. The representatives appointed above shall meet as necessary during the term of project implementation and shall make such recommendations as they deem warranted to the Contracting Officer.

c. The Contracting Officer shall consider the recommendations of the representatives in all matters relating to the project, but the Contracting Officer, having ultimate responsibility for construction of the project, has complete discretion to accept, reject, or modify the recommendations of the representatives. No action shall be taken by the Local Sponsor with respect to plans, specifications, scheduling, modifications, contract costs or other matters affecting the incidence of costs under this Project without the prior written approval of the Contracting Officer.

## ARTICLE VI - METHOD OF PAYMENT

a. Pursuant to Article II.a. of this agreement, the State shall provide, prior to advertisement of the construction contract, fifty (50) percent of the total estimated project costs. Total project costs are presently estimated to be \$74,000, of which an estimated \$5,100 will be in the form of lands, easements and rights-of-way, (exclusive of the licensed lands), utility and facility alterations and relocations, reasonable costs of planning, engineering, design, supervision and administration, and other approved services or construction in kind to be provided by the State. Said estimated costs are shown in more detail in Exhibit A attached hereto. In order to meet its 50 percent share, the State must provide a cash contribution presently estimated at \$31,900.

b. The Government shall, thirty (30) calendar days prior to issuance of the invitation for bids on the construction contract, notify the State of its estimated share of total project costs, after crediting the State's share with the estimated value of any additional lands, easements, and rights-of-way, not within the licensed lands, which are acquired and made available by the State, cost of relocations and alterations, and other approved costs, services or construction in kind, provided or to be provided by the State. Within twenty (20) calendar days after receipt of said notice, the State shall provide the Government the full amount of the required contribution.

c. When bids are opened on the construction contract and additional funds are needed from the State to meet its required share of total estimated project costs, the Government shall so notify the State, and the State shall deposit the additional funds within 10 calendar days after demand is made by the Government.

d. Upon completion of the Project and resolution of all contract claims and appeals, the Government will compute the total project costs and tender to the State a final accounting of its share of total project costs. In the event the total contribution by the State is less than its required share of

total project costs at the time of the final accounting, the State shall deposit within ninety (90) calendar days after receipt of written notice whatever sum is required to meet its required share of total project costs. In the event the State has made excess cash contributions and/or provided services which result in the State's having provided more than its required share of total project costs, the Government shall, subject to the availability of funds, return to the State such cash contributions in excess of its required 50 percent share within ninety (90) calendar days of the final accounting of total project costs. Neither party shall be entitled to interest on funds returned pursuant to final accounting.

#### ARTICLE VII - DISPUTES

Before any party to this Agreement may bring suit in any court concerning an issue relating to this Agreement, such party must first seek in good faith to resolve the issue through negotiation or through other forms of non-binding alternative dispute resolution.

#### ARTICLE VIII - OPERATION, MAINTENANCE, AND REHABILITATION

a. Upon completion of construction, the State will operate, maintain and rehabilitate facilities of the Project in accordance with regulations or directions prescribed by the Secretary of the Army.

b. The State hereby gives the Government a right to enter, at reasonable times and in a reasonable manner, upon land which it owns or controls for access to the Project for the purpose of inspection, and, if necessary, for the purpose of completing, operating, repairing, and maintaining the Project. If an inspection shows that the State for any reason is failing to complete, operate, repair, and maintain the Project in accordance with the assurances hereunder, the Government will send a written notice to the State. If the State persists in such failure for thirty (30) calendar days after receipt of the notice, then the Government shall have a right to enter, at reasonable times and in a reasonable manner, upon lands the State owns or controls for

access to the Project for the purpose of completing, operating, repairing, or maintaining the Project. No completion, operation, repair, or maintenance by the Government shall operate to relieve the State of responsibility to meet its obligations as set forth in this Agreement, or to preclude the Government from pursuing any other remedy at law or equity to assure faithful performance pursuant to this Agreement.

#### ARTICLE IX - RELEASE OF CLAIMS

The State will hold and save the Government free from all damages arising from the construction and operation of the project, except for damages due to the fault or negligence of the Government or its contractors.

#### ARTICLE X - MAINTENANCE OF RECORDS

The Government and the State shall keep books, records, documents, and other evidence pertaining to costs and expenses incurred pursuant to this Agreement to the extent and in such detail as will properly reflect total project costs. The Government and the State shall maintain such books, records, documents, and other evidence for a minimum of three years after completion of construction of the project and resolution of all claims arising therefrom, and shall make available at their offices at reasonable times, such books, records, documents, and other evidence for inspection and audit by authorized representatives of the parties to this Agreement.

#### ARTICLE XI - FEDERAL AND STATE LAWS

a. In acting under its rights and obligations hereunder, the State agrees to comply with all applicable Federal and state laws and regulations.

b. The State agrees to comply with Section 601 of Title VI of the Civil Rights Act of 1964 (Public Law 88-352) and Department of Defense Directive 5500.11 issued pursuant thereto and published in Part 300 of Title 32, Code of Federal Regulations, in connection with the construction, operation and maintenance of the Project.

## ARTICLE XII - RELATIONSHIP OF PARTIES

The parties to this Agreement act in an independent capacity in the performance of their respective functions under this Agreement, and neither party is to be considered the officer, agent, or employee of the other.

## ARTICLE XIII - OFFICIALS NOT TO BENEFIT

No member of or delegate to the Congress, or resident commissioner, shall be admitted to any share or part of this Agreement, or to any benefit that may arise therefrom.

## ARTICLE XIV - COVENANT AGAINST CONTINGENT FEES

The State warrants that no person or selling agency has been employed or retained to solicit or secure this Agreement upon agreement or understanding for a commission, percentage, brokerage, or contingent fee, excepting bona fide employees or bona fide established commercial or selling agencies maintained by the State for the purpose of securing business. For breach or violation of this warranty, the Government shall have the right to annul this Agreement without liability, or, in its discretion, to add to the Agreement or consideration, or otherwise recover, the full amount of such commission, percentage, brokerage, or contingent fee.

## ARTICLE XV - FEES AND CHARGES

The State may assess and collect fees for entrance to and use of areas and facilities developed under this agreement in accordance with a fee schedule mutually agreed to by the parties. An initial mutually acceptable fee schedule will be developed if and when any entrance or user fees are contemplated by the State. Not less often than every five years, the parties will review such schedule and, upon the request of either, consider revision of the schedule.



## ARTICLE XVI - TRANSFER OR ASSIGNMENT

The State shall not transfer or assign this contract nor any rights acquired thereunder, nor grant any interest, privilege, or license whatsoever in connection with the contract without the approval of the Secretary of the Army or his authorized representative.

## ARTICLE XVII - ENVIRONMENTAL QUALITY

a. In furtherance of the purpose and policy of the National Environmental Policy Act of 1969 (Public Law 91-190, 42 U.S.C. 4321, 4331-4335) and Executive Order 11514, entitled "Protection and Enhancement of Environmental Quality," March 5, 1970 (35 Federal Register 4247, March 7, 1970), the Government and the State recognize the importance of preservation and enhancement of the quality of the environment and the elimination of environmental pollution. Actions by either party will be after consideration of all possible effects upon the project environmental resources and will incorporate adequate and appropriate measures to ensure that the quality of the environment will not be degraded or unfavorably altered.

b. During construction, operation and/or maintenance and/or rehabilitation undertaken by either party, specific actions will be taken to control environmental pollution which could result from their activities and to comply with applicable Federal, State and local laws and regulations concerning environmental pollution. Particular attention should be given to (1) reduction of air pollution by control of burning, minimization of dust, containment of chemical vapors, and control of engine exhaust gases and smoke from temporary heaters; (2) reduction of water pollution by control of sanitary facilities, storage of fuels and other contaminants, and control of turbidity and siltation from erosion; (3) minimization of noise levels; (4) on-and off-site disposal of waste and spoil activities; and (5) prevention of landscape defacement and damage.

#### ARTICLE XVIII - TERMINATION OR SUSPENSION

a. If at any time the State fails to make the payments required under this Agreement, the Secretary of the Army shall terminate or suspend work on the Project until the State is no longer in arrears or unless the Secretary determines that continuation of work on the project is in the interest of the United States. Any delinquent payment shall be charged interest at a rate, to be determined by the Secretary of the Treasury, equal to 150 percentum of the average bond equivalent rate of the 13-week Treasury Bills auctioned immediately prior to the date on which such payment became delinquent, or auctioned immediately prior to the beginning of each additional 3-month period if the period of delinquency exceeds 3 months.

b. If the Government fails to receive annual appropriations in amounts sufficient to meet expenditures for the Bennington Project for the then-current fiscal year, the Government shall so notify the State. After sixty (60) calendar days following such notification, either party may elect without penalty to terminate this Agreement or to suspend performance thereunder, and the parties shall proceed to wind up their activities relating to the Project and proceed to a final accounting in accordance with Article VI.d.

#### ARTICLE XIX - STATEMENT OF INTENT

As required under Title I, Chapter VI, of Public Law 99-88, the State hereby affirms its willingness and capability to meet its cost-sharing obligations as set forth in this Agreement.

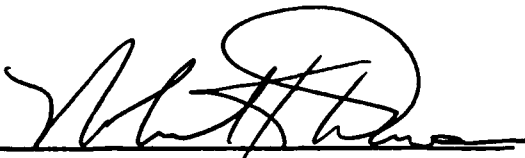
#### ARTICLE XX - EFFECT OF SUBSEQUENT LEGISLATION

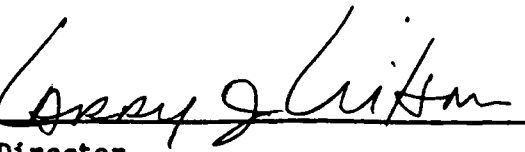
If, subsequent to the date of this Agreement, Congress enacts into law a change in the cost-sharing for this Project, the parties hereto shall be bound by such a change, and this Agreement shall be amended accordingly.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement as of the day and year first above written.

THE DEPARTMENT OF THE ARMY

STATE OF IOWA


BY   
ROBERT K. DAWSON  
Assistant Secretary of the Army  
(Civil Works)


BY   
Director  
State Conservation Commission

DATE 26 June 1986

DATE June 23, 1986

AS WITNESSED BY:

  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

  
Allen L. Farris  
Michael Casser  
\_\_\_\_\_  
\_\_\_\_\_

CERTIFICATE OF AUTHORITY

I, Michael H. Smith, do hereby certify that I am  
<sup>an Assistant</sup>~~the~~ Attorney General for the State of Iowa, that the State of Iowa, acting by  
and through the State Conservation Commission, is a legally constituted public  
body with full authority and legal capability to perform the terms of the  
Agreement between the DEPARTMENT OF THE ARMY and the State of Iowa in  
connection with the Bennington Bridge River Access Project in the Des Moines  
Recreational River and Greenbelt Project, and to pay damages, if necessary, in  
the event of the failure to perform in accordance with Section 221 of Public  
law 91-611, and that the person who has executed the Agreement on behalf of  
the State of Iowa has acted within his statutory authority.

IN WITNESS WHEREOF, I have made and executed this Certificate this  
23 day of June, 1986.

Michael H. Smith  
Assistant Attorney General, State of Iowa

APPENDIX B

SITE MANAGER'S PROJECT INSPECTION CHECKLIST

OPERATION AND MAINTENANCE MANUAL  
DES MOINES RECREATIONAL RIVER AND GREENBELT  
BENNINGTON BRIDGE  
BOAT RAMP  
MARION COUNTY, IOWA

SITE MANAGER'S PROJECT INSPECTION CHECKLIST

Inspected by \_\_\_\_\_ Date \_\_\_\_\_

Type of Inspection (annual) (other)

1. PROJECT INSPECTION.

<u>Item</u>	<u>Comment</u>
a. <u>Access Road, Parking Lot, and Turnaround.</u>	
( ) Corrugations/potholes/ruts	
( ) Displaced/missing crushed stone or fill	
( ) Culverts	
( ) Spalling and cracking of wheel stops	
( ) Signs/Pavement markings	
( ) Settlements	
( ) Granular road surface	
b. <u>Grassed Slopes and Drainage Areas.</u>	
( ) Erosion	
( ) Weeds	
( ) Grass	
( ) Corrugated metal pipe	

OPERATION AND MAINTENANCE MANUAL  
DES MOINES RECREATIONAL RIVER AND GREENBELT  
BENNINGTON BRIDGE  
BOAT RAMP  
MARION COUNTY, IOWA

SITE MANAGER'S PROJECT INSPECTION CHECKLIST (Cont'd)

<u>Item</u>	<u>Comment</u>
c. <u>Boat Ramp.</u>	
( ) Displaced/Missing Riprap	
( ) Displaced/Missing Rockfill	
( ) Spalling or Cracking of Concrete	
( ) Expansion/Contraction Joints Condition	
( ) Toe riprap displacement	
( ) Hazards/cleanliness	
d. <u>Stone Protection.</u>	
( ) Embankment eroding from under the riprap	
( ) Woody vegetation growing through the riprap	
( ) Displaced riprap	
( ) Significant deterioration of the riprap	

---

Site Manager

APPENDIX C

DISTRIBUTION



DISTRIBUTION: 1/

Mr. Larry Wilson (2)  
Director, Department of Natural Resources  
Wallace State Office Building  
Des Moines, Iowa 50319-0034

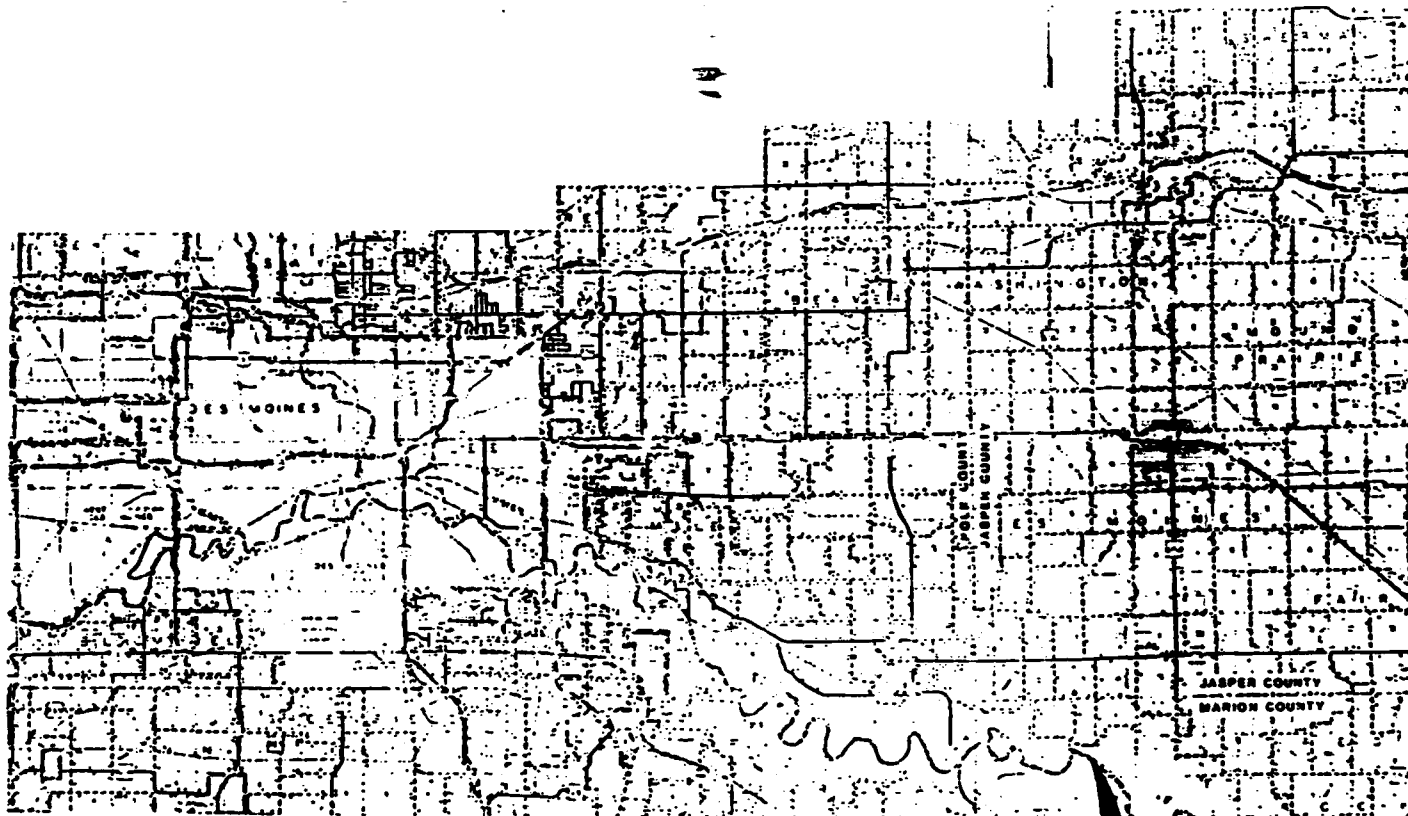
Division Engineer (2)  
U.S. Army Engineer Division, North Central  
ATTN: CENCD-CO-O  
111 North Canal Street, 12th Floor  
Chicago, Illinois 60606-7206

District Engineer  
U.S. Army Engineer District, Rock Island  
Clock Tower Building - P.O. Box 2004  
Rock Island, Illinois 61204-2004  
ATTN: CENCR-CD  
CENCR-ED  
CENCR-ED-D  
CENCR-ED-DG  
CENCR-IM-C (3)  
CENCR-OD-S  
CENCR-OD-RR

1/ All addressees receive one copy of the document except where noted in parentheses

**APPENDIX D**

**PLATES**

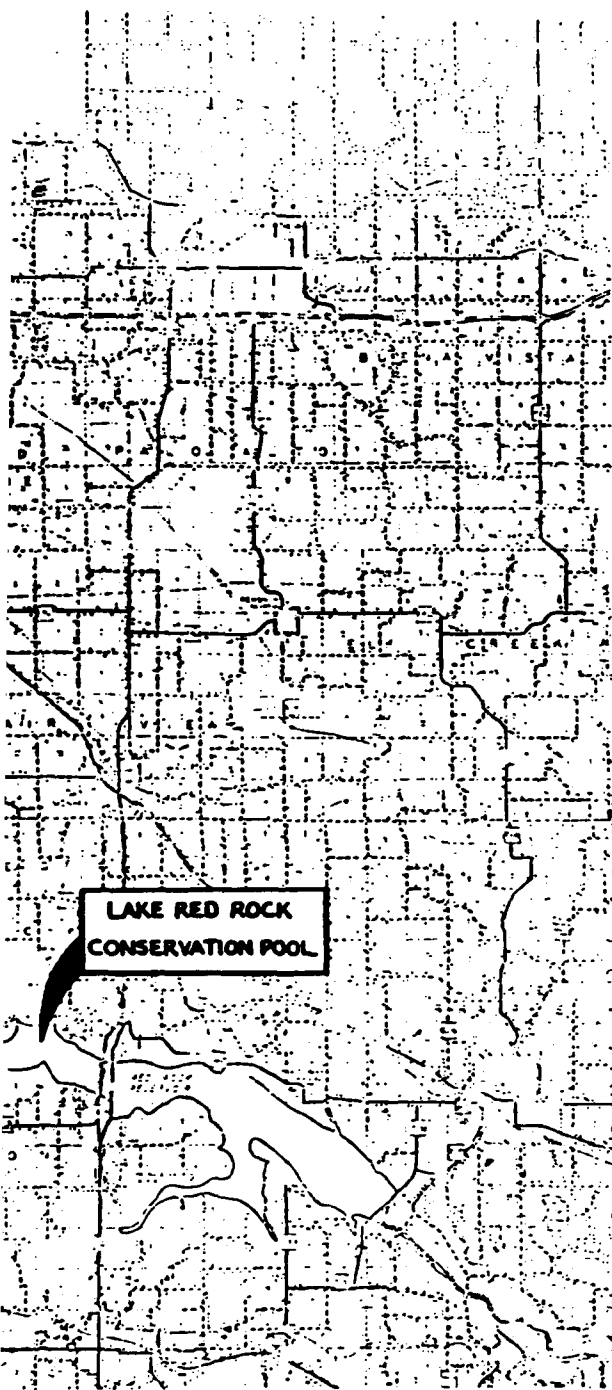


PROJECT LOCATION  
BENNINGTON BOAT RAMP

LOCATION PLAN  
No Scale



VICINITY MAP  
0 25 50 75  
SCALE IN MILES



INDEX			
SHEET NO.	DWG. CODE	SHEET REF. NO.	DESCRIPTION
1	RR-92	X-1	LOCATION MAPS AND INDEX
2	RR-92	C-1	SITE PLAN I
3	RR-92	C-2	SITE PLAN II
4	RR-92	C-3	BOAT RAMP PROFILE AND CROSS SECTIONS
5	RR-92	C-4	BOAT RAMP CROSS SECTIONS II
6	RR-92	C-5	PARKING LOT AREA CROSS SECTIONS I
7	RR-92	C-6	PARKING LOT AREA CROSS SECTIONS II
8	RR-92	C-7	PARKING LOT AREA CROSS SECTIONS III
9	RR-92	C-8	TYPICAL SECTIONS AND MISCELLANEOUS DETAILS
9A	RR-92	C-8A	BOAT RAMP SECTION AND DETAILS
10	RR-92	C-9	METAL PIPE APRONS AND BEVELED ENDS
11	RR-92	C-10	PIPE CULVERT INSTALLATION DETAILS (COVER AND CAMBER)
12	RR-92	C-11	PIPE CULVERT INSTALLATION DETAILS (BEDDING AND BACKFILL)
13	RR-92	C-12	WHEEL STOP

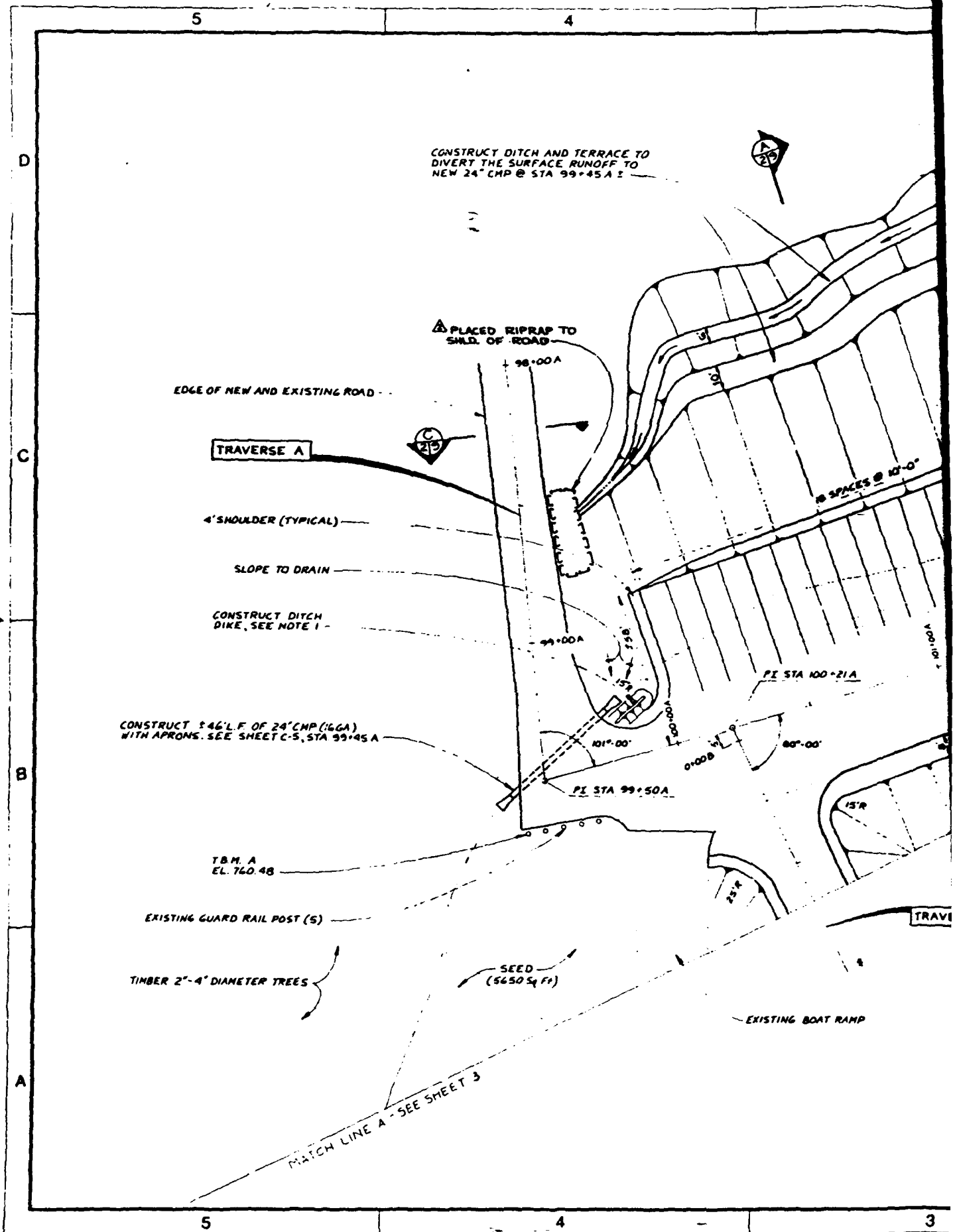
#### GENERAL NOTES:

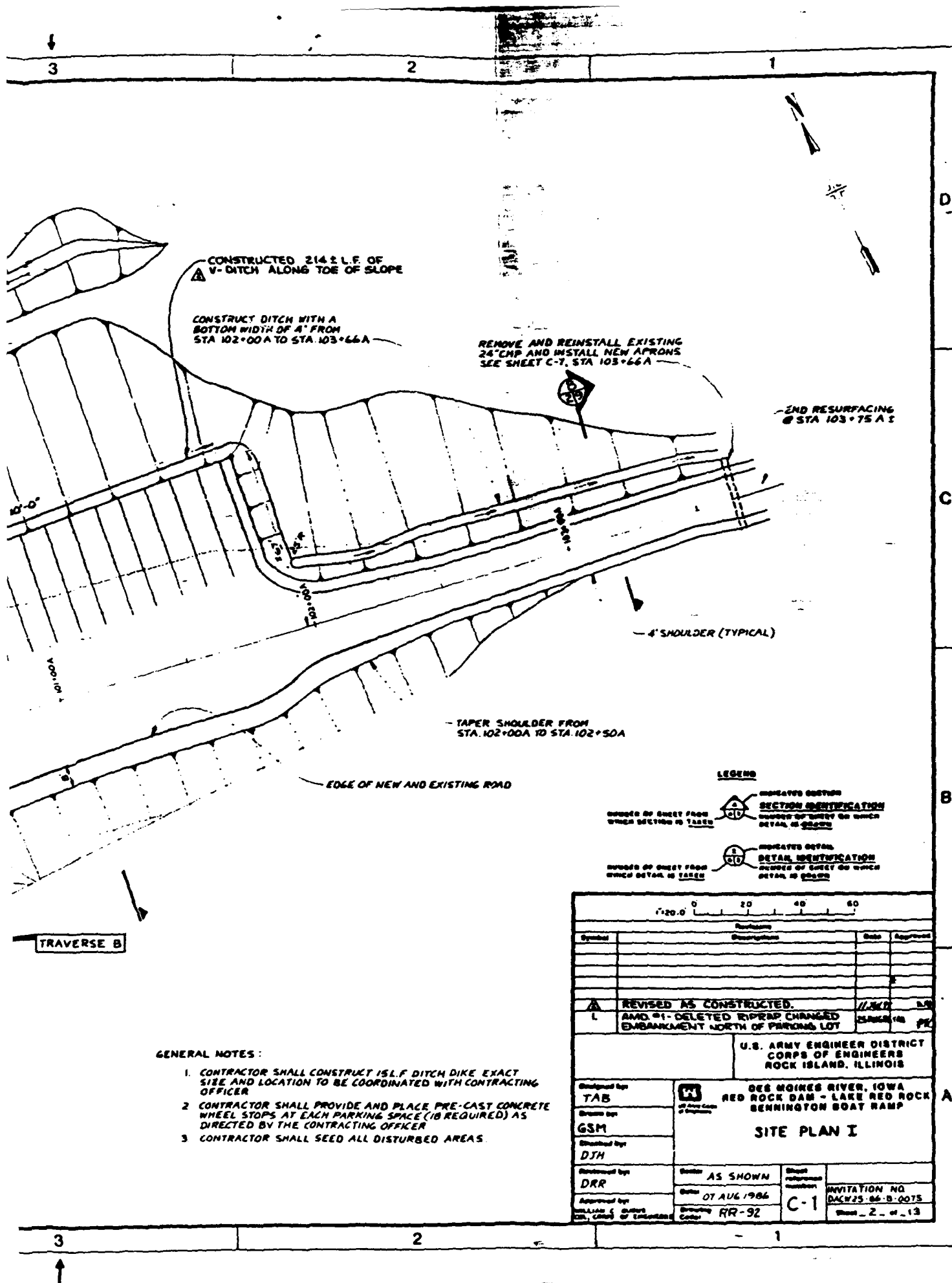
1. ALL ELEVATIONS REFER TO NATIONAL GEODETIC VERTICAL DATUM
2. ALL CROSS SECTIONS SHOWN ARE TAKEN LOOKING DOWN THE TRAVERSE LINE.

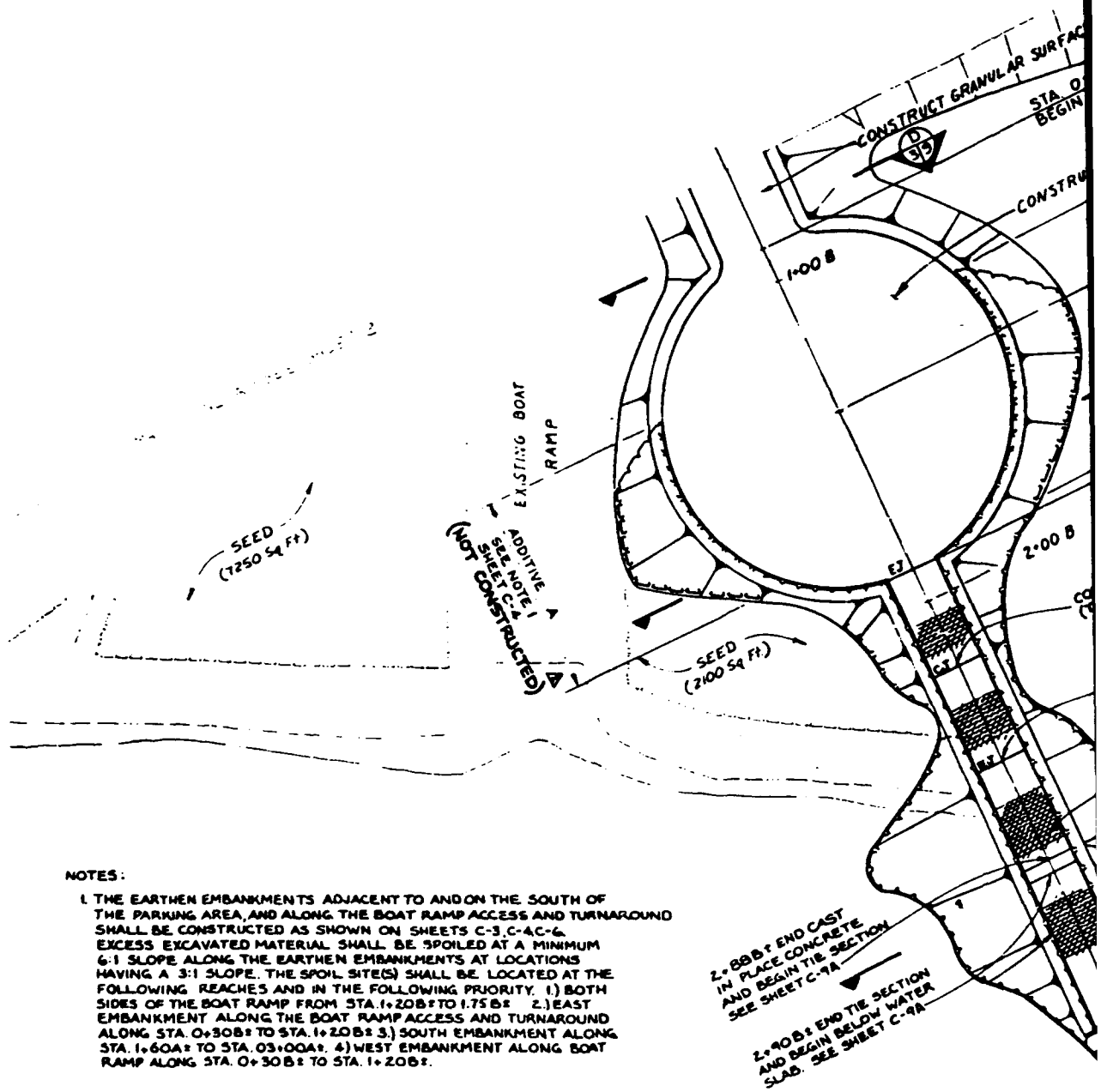
SIGNATURES APPLIED BELOW INDICATE OFFICIAL RECOMMENDATION AND APPROVAL OF ALL DRAWINGS IN THIS SET AS INDICATED ON EACH INDIVIDUAL TITLE BLOCK

Prepared by:  
U.S. Army Engineer District Rock Island  
Submitted by:  
Checked by: NA  
Chief Hydraulic Engineer: NA  
Chief Geotechnical Engineer: NA  
Approved by: R  
William C. O'Neil, 744g Sh  
Chief of Engineers

Revision: Description: _____ Date: _____ Approved: _____	
AS CONSTRUCTED. 1. AMO. 61 ADDED SHEET 9-A TO SET. 2. 11/2/91	
U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS ROCK ISLAND, ILLINOIS	
Designed by: TAG	DES MOINES RIVER, IOWA RED ROCK DAM - LAKE RED ROCK BENNINGTON BOAT RAMP
Drawn by: GSM	<b>LOCATION MAPS AND INDEX</b>
Checked by: LW	Scale: AS SHOWN/ Shot reference number: X-1
Reviewed by: Approved by:	Date: 07 AUGUST 1986 Drawing Code: RR-92
INVITATION NO. DACW 23-86 9-0075 1-1-1-13	

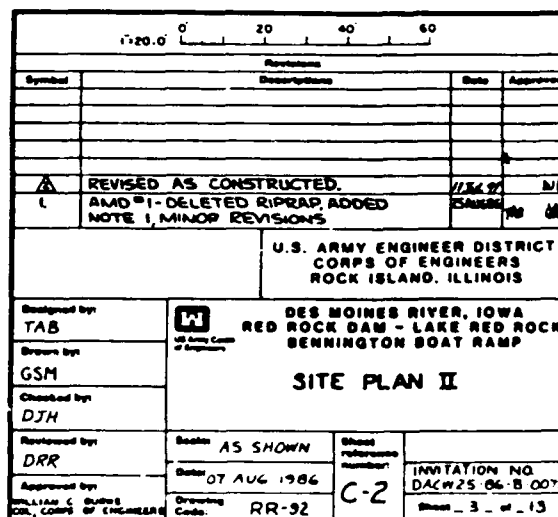




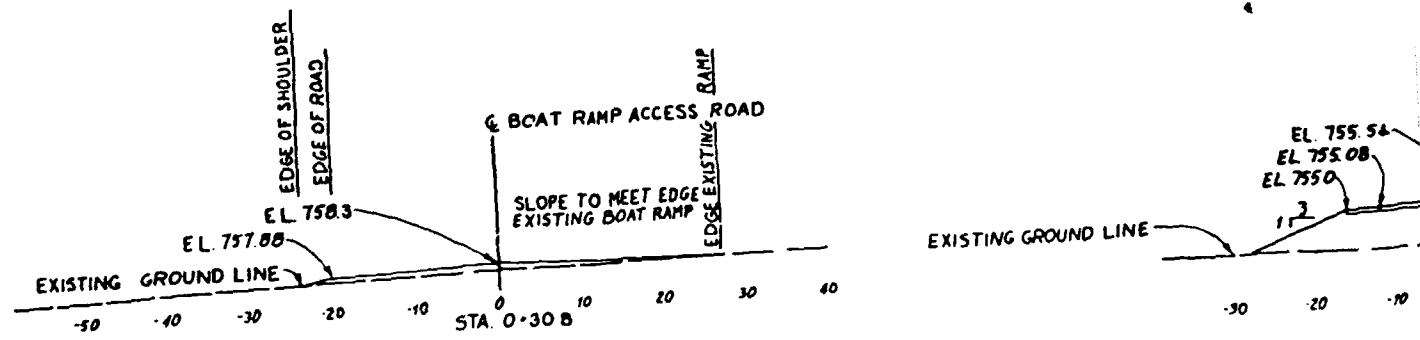
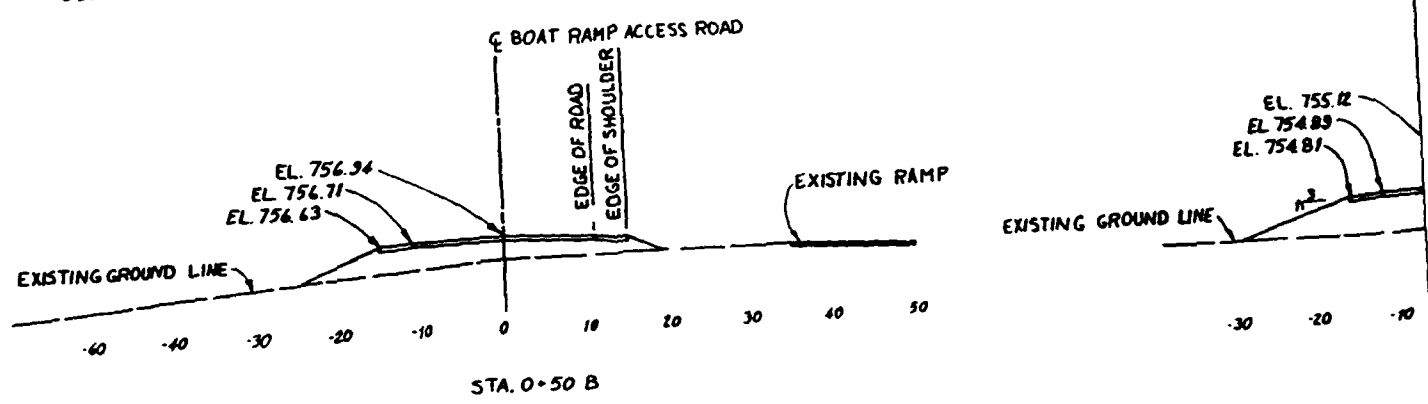
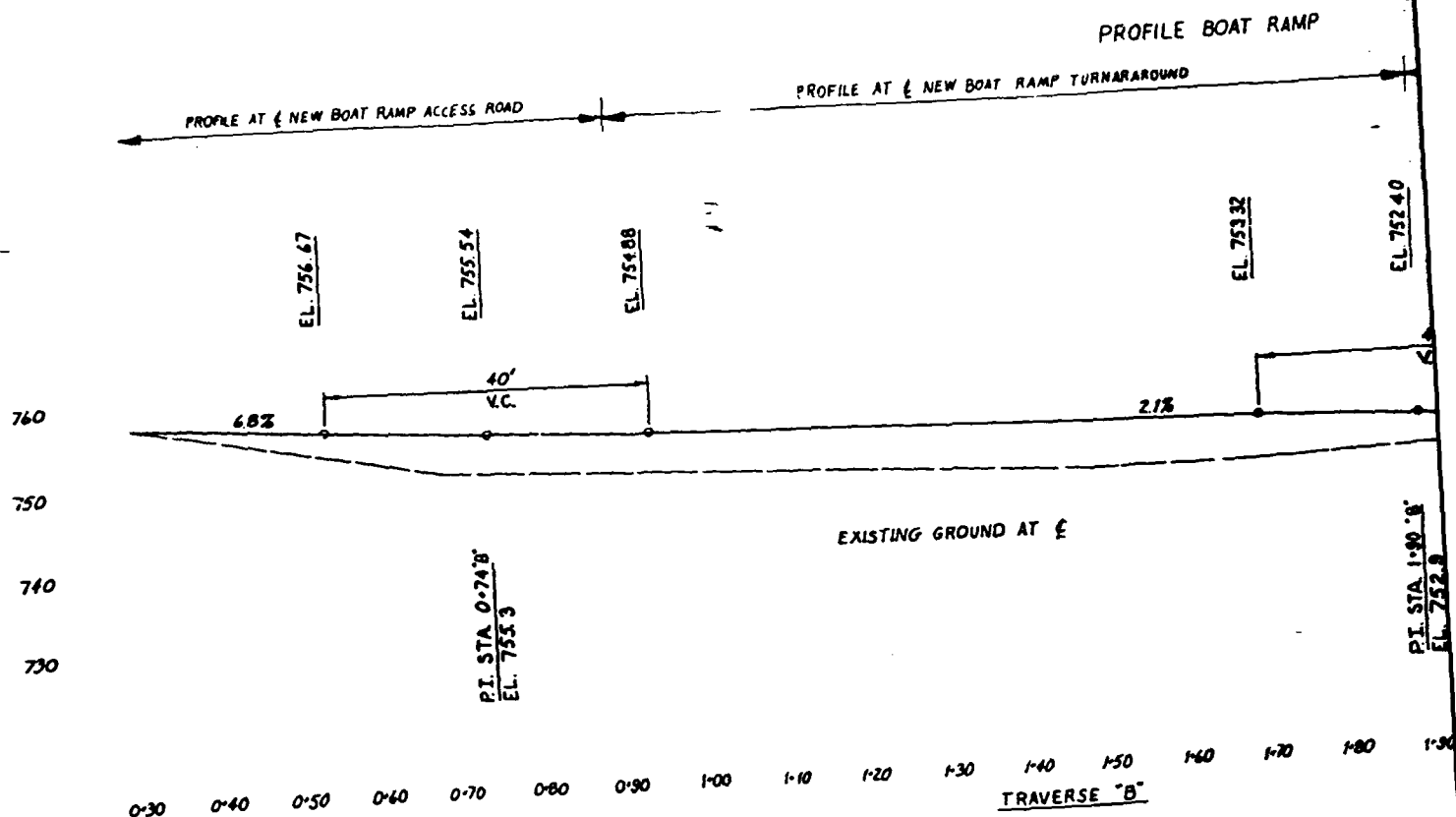


**NOTES:**

1. THE EARTHEN EMBANKMENTS ADJACENT TO AND ON THE SOUTH OF THE PARKING AREA, AND ALONG THE BOAT RAMP ACCESS AND TURNAROUND SHALL BE CONSTRUCTED AS SHOWN ON SHEETS C-3, C-4, C-5, C-6. EXCESS EXCAVATED MATERIAL SHALL BE SPOILED AT A MINIMUM 6:1 SLOPE ALONG THE EARTHEN EMBANKMENTS AT LOCATIONS HAVING A 3:1 SLOPE. THE SPOIL SITE(S) SHALL BE LOCATED AT THE FOLLOWING REACHES AND IN THE FOLLOWING PRIORITY: 1) BOTH SIDES OF THE BOAT RAMP FROM STA. 1+208 TO 1+758; 2) EAST EMBANKMENT ALONG THE BOAT RAMP ACCESS AND TURNAROUND ALONG STA. 0+308 TO STA. 1+208; 3) SOUTH EMBANKMENT ALONG STA. 1+608 TO STA. 0+308; 4) WEST EMBANKMENT ALONG BOAT RAMP ALONG STA. 0+308 TO STA. 1+208.

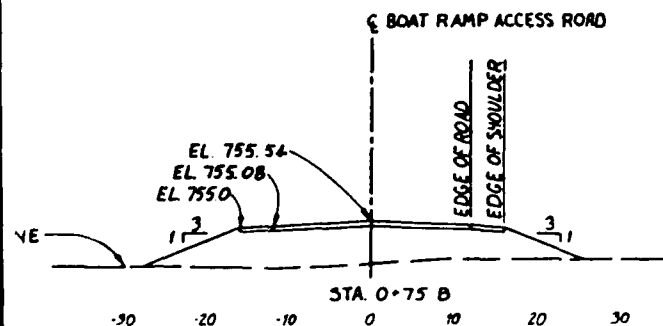
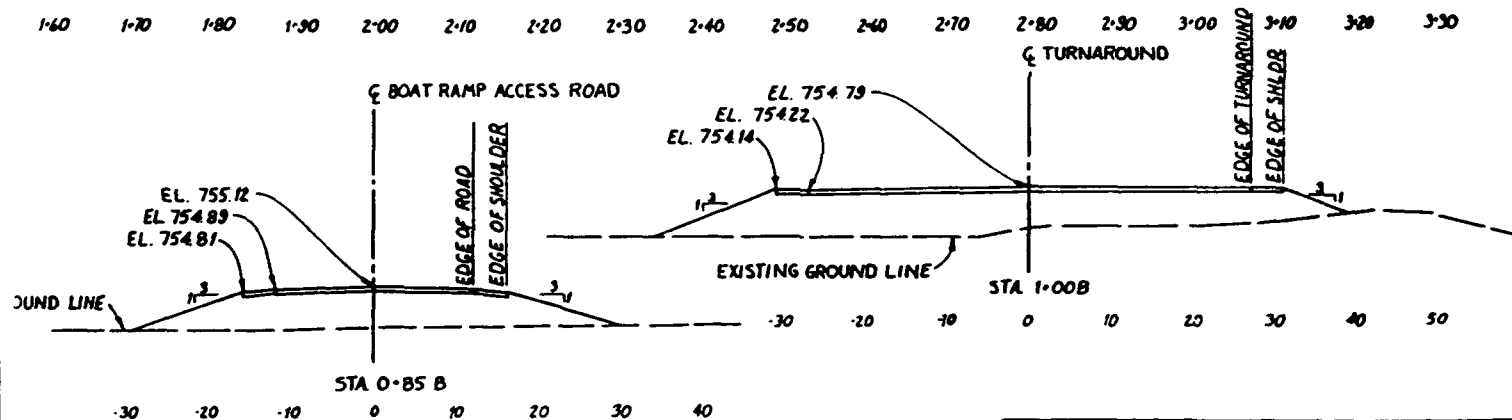
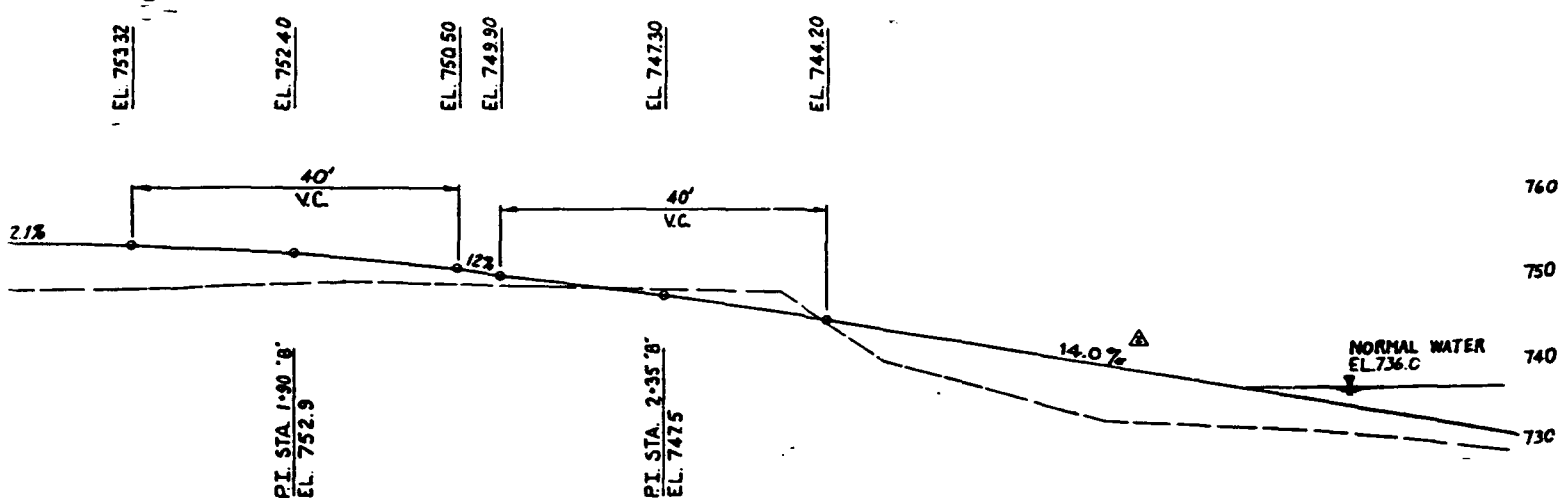




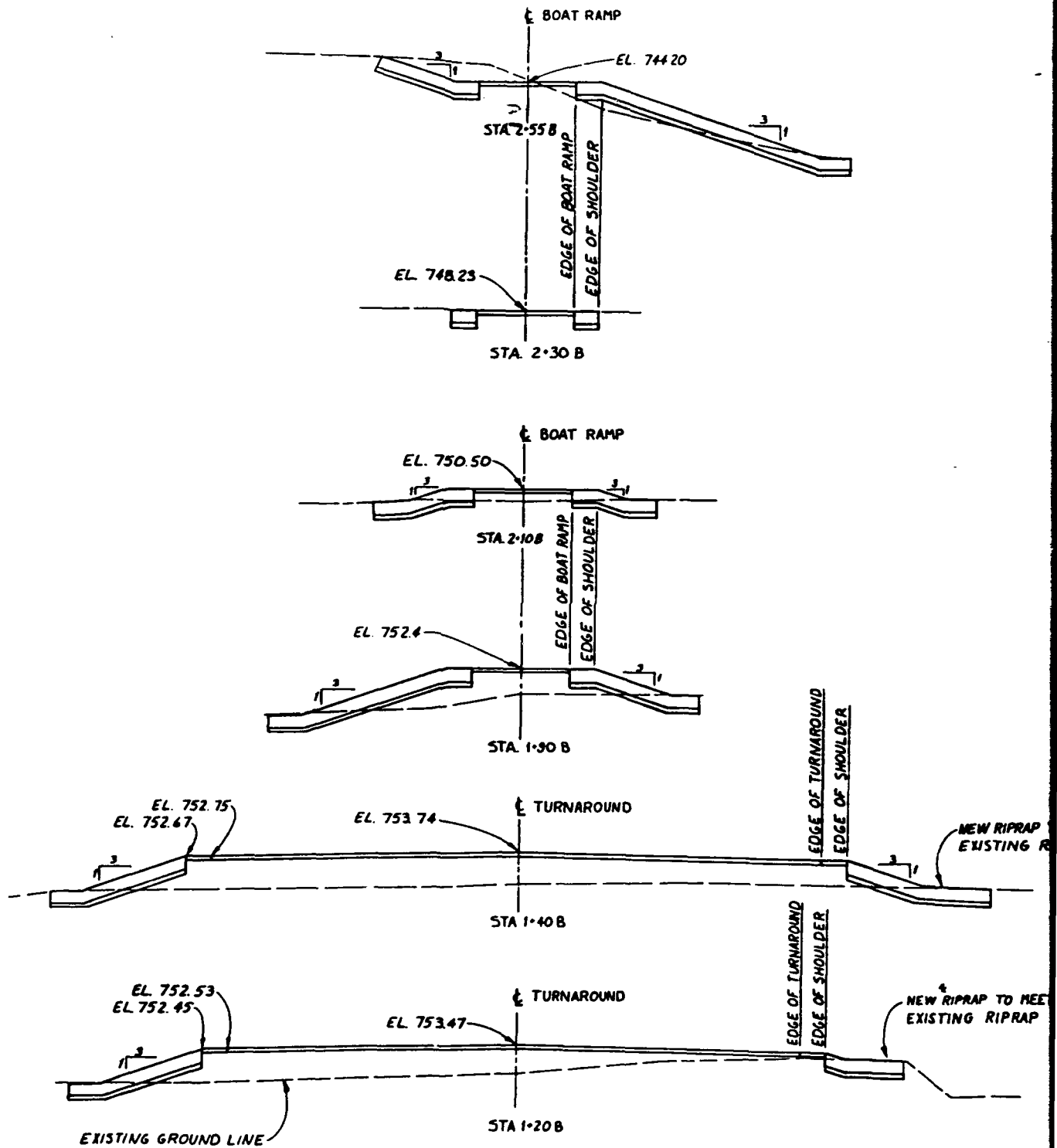


**RAROUND**

PROFILE AT NEW BOAT RAMP

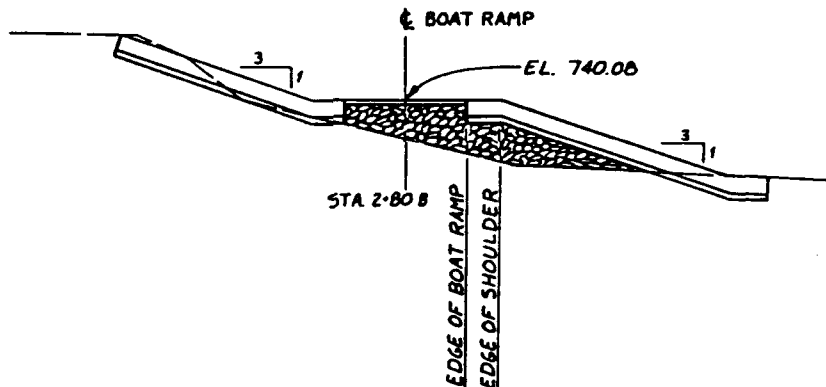
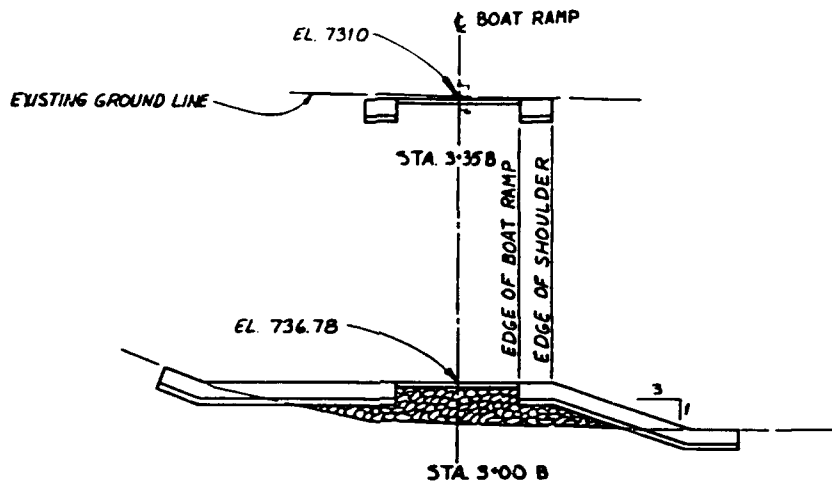
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-70 -60 -50 -40 -30 -20 -10 0 10 20 30 40 50 60 70 -80



-80 -70 -60 -40 -30 -20 -10 0 10 20 30 40 50 60 70 -80

60 70 80 90 -50 -40 -30 -20 -10 0 10 20 30 40 50



**NOTES:**

1. THE RIPRAP AND BEDDING SHOWN AT STATION 1+20.8 AND STATION 1+40.8 IS AN ADDITIVE BID ITEM (SEE SHEET C-2). FOR THE BASE BID THE RIPRAP AND BEDDING SHALL BE OMITTED AND THE SIDE SLOPES CONSTRUCTED FROM THE EDGE OF SHOULDER ON A 3:1 RATIO TO MEET EXISTING GROUND.

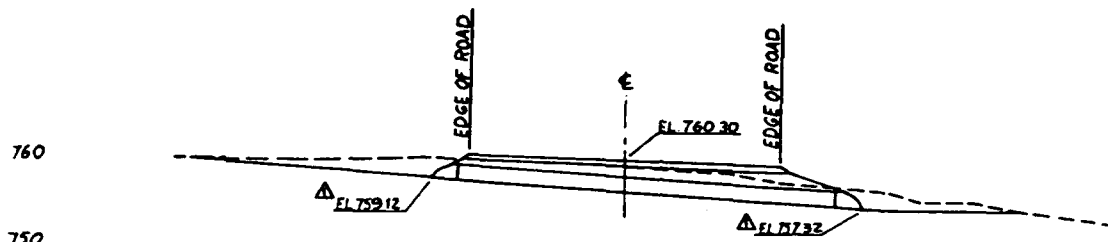
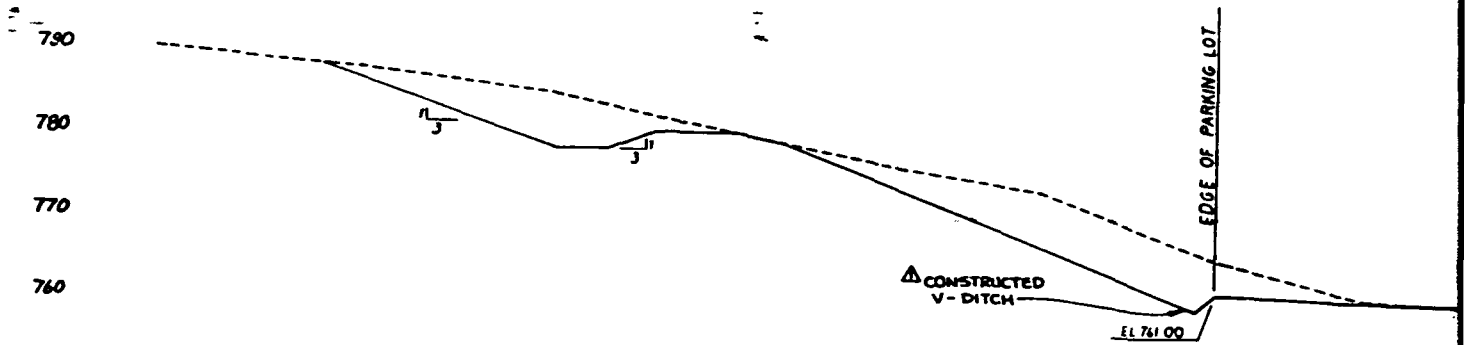
△ (ADDITIVE ITEM NOT CONSTRUCTED)

20 30 40 50

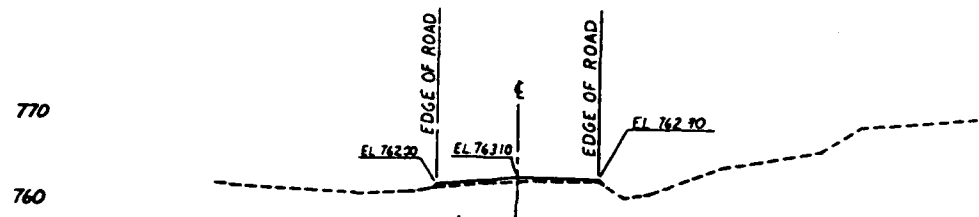
Revisions			
Symbol	Description	Date	Approved
△	REVISED AS CONSTRUCTED.	11/2/80	WJ
1	AMC #1-ADDED NOTE 1, MAJOR REVISIONS	11/2/80	WJ
<b>U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS ROCK ISLAND, ILLINOIS</b>			
Designed by: <b>TAB</b> Drawn by: <i>[Signature]</i> Checked by: <b>DJH</b> Reviewed by: <b>DAR</b>		<b>DES MOINES RIVER, IOWA RED ROCK DAM - LAKE RED ROCK BENNINGTON BOAT RAMP</b> <b>BOAT RAMP CROSS SECTIONS II</b>	
Approved by: <b>WILLIAM C. BLUMS COL, CORPS OF ENGINEERS</b>		Scale: <b>AS SHOWN</b> Date: <b>07 August 80</b> Drawing Code: <b>RR-92</b>	Sheet Reference Number: <b>C-4</b> INVIATION NO. <b>DAW 85-84-8-0025</b> Sheet <b>5</b> of <b>13</b>

60 70 80 -50 -40 -30 -20 -10 0 10

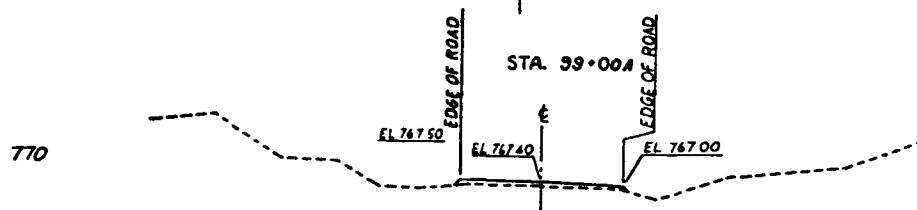
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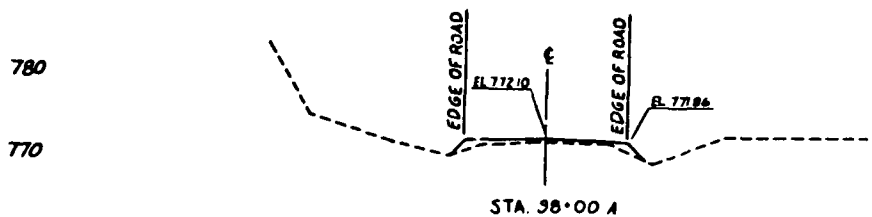
STA 99+45 A



STA. 99+00 A



STA 98+50 A



STA. 98+00 A

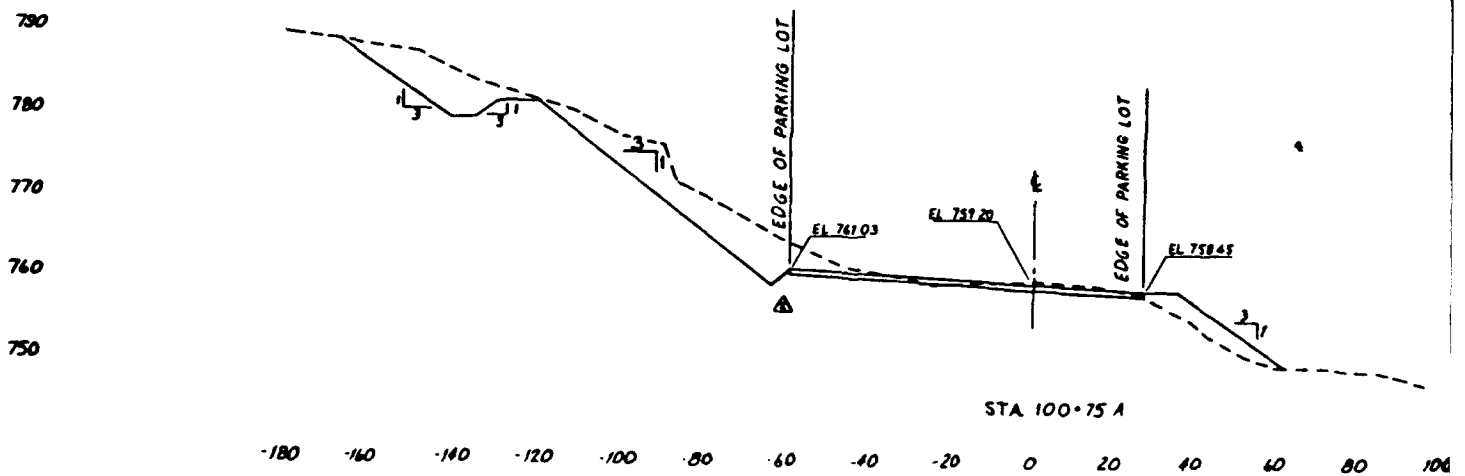
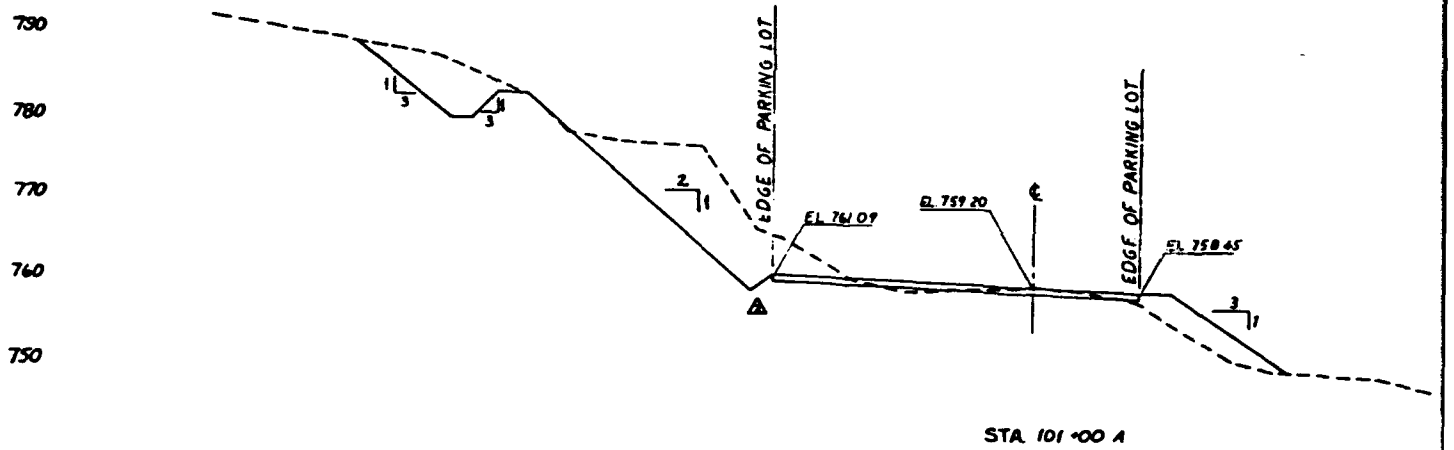
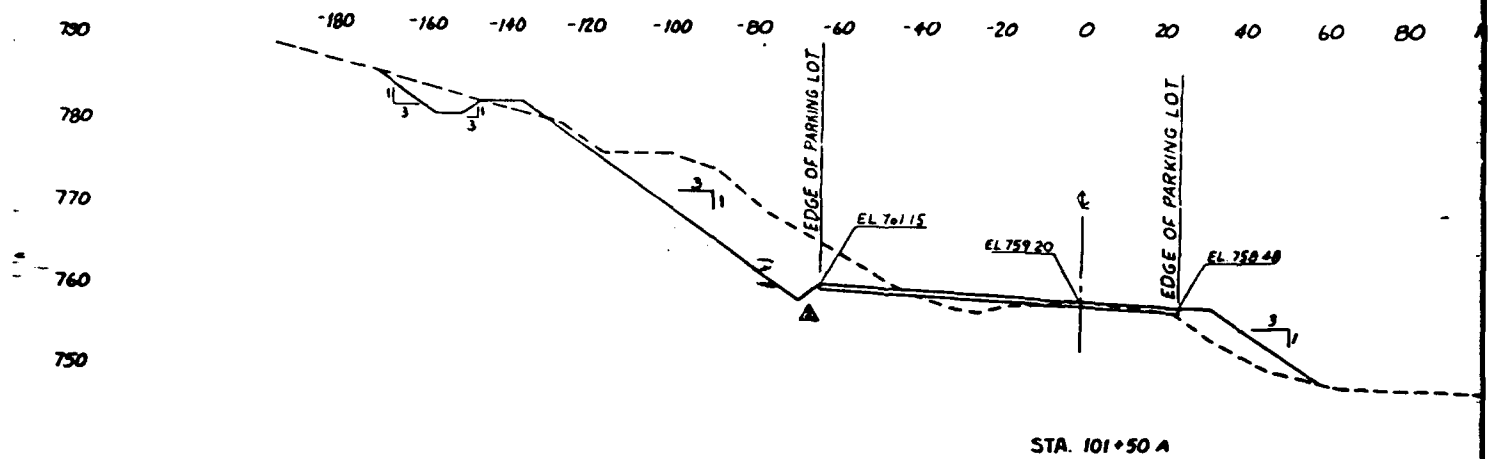
EDGE OF PARKING LOT

EL 759.20

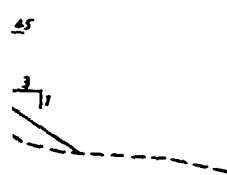
EL 758.00

STA 100+35.1

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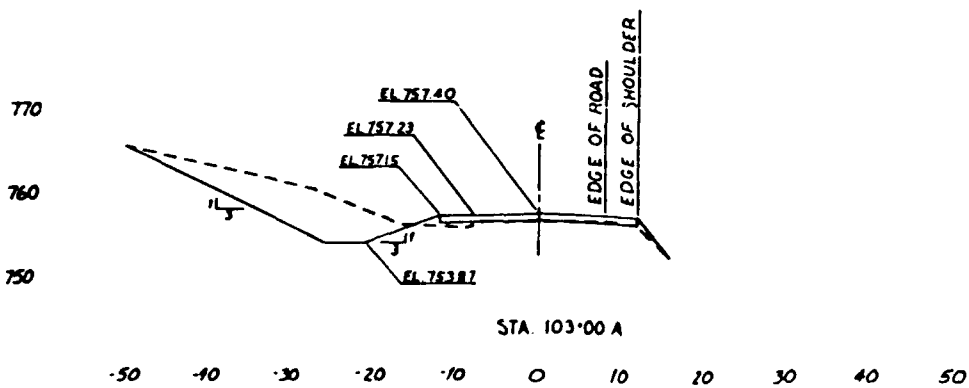
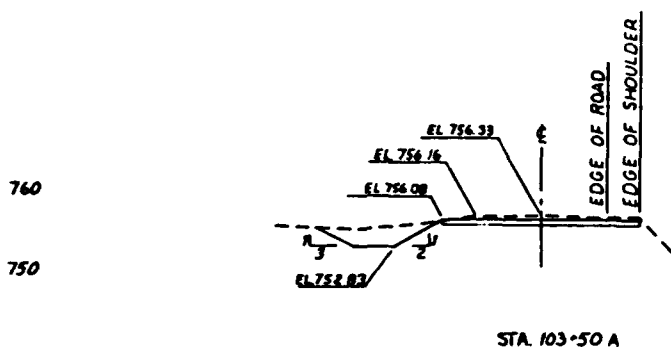
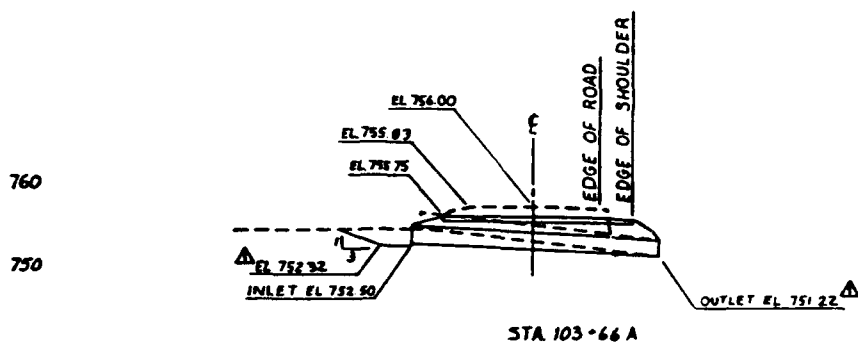


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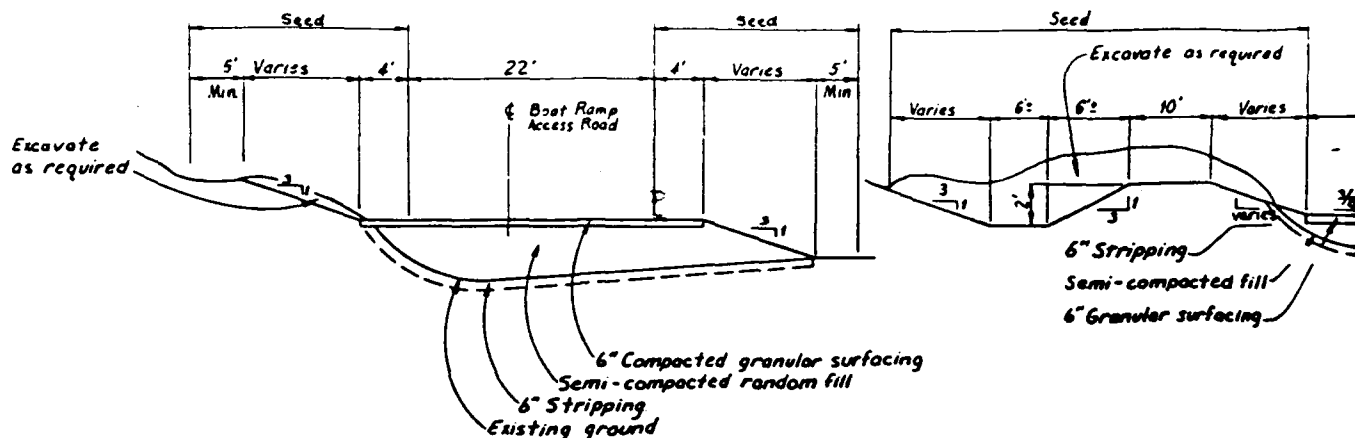
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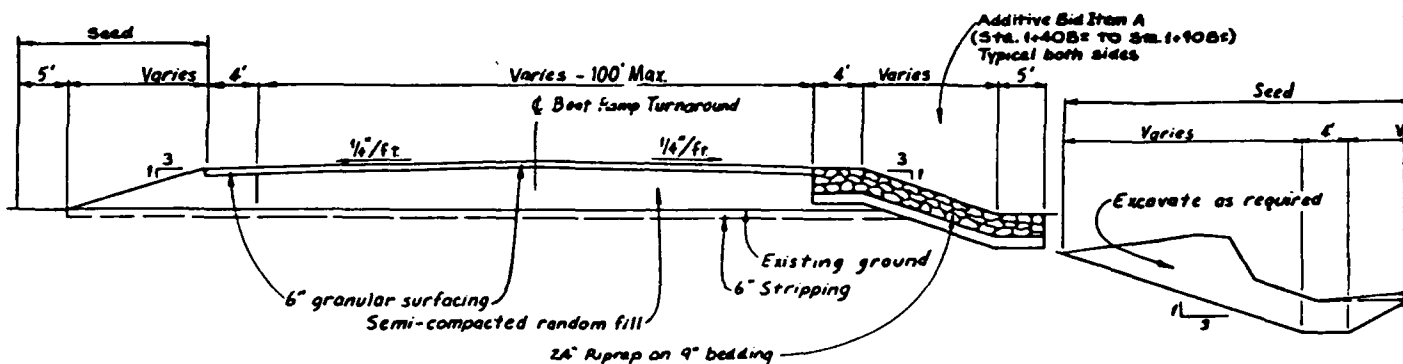


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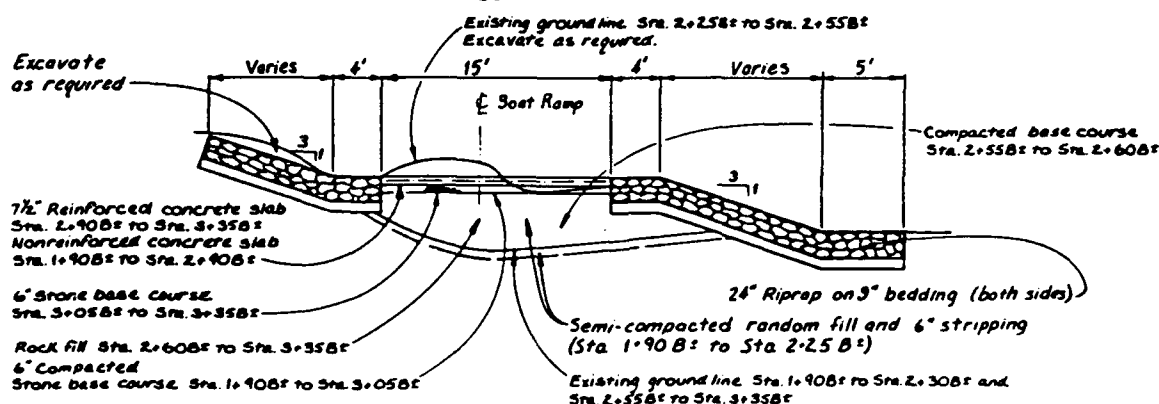
**TYPICAL STA. 0+308± TO STA. 0+908±**  
**TYPICAL BOAT RAMP ACCESS ROAD SECTION**  
 No Scale

**TYPICAL ST. 319**  
**PARKING**



**TYPICAL STA. 0+908± TO STA. 1+908±**  
**BOAT RAMP TURNAROUND SECTION**  
 No Scale

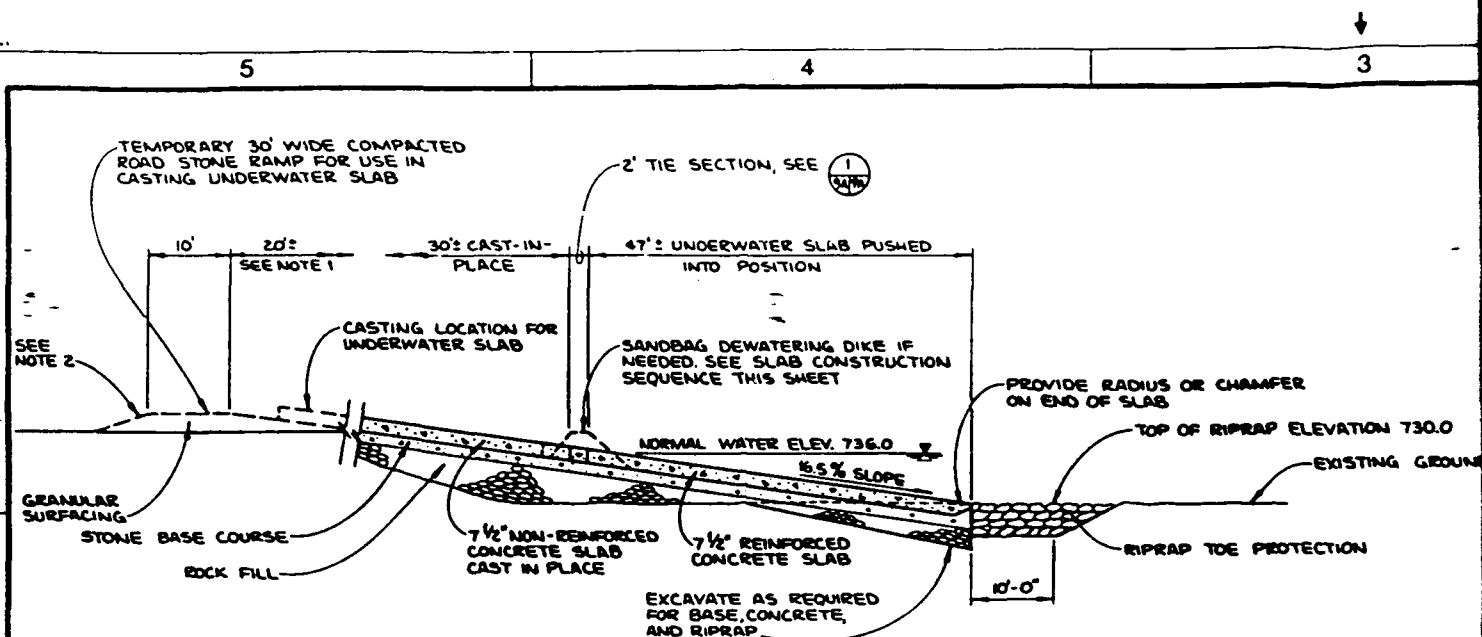
**TYPICAL ST. 319**



**TYPICAL STA. 1+908± TO STA. 3+358±**  
**BOAT RAMP SECTION**  
 No Scale

**TYPICAL ST. 319**  
 1/2" Remolded joint filler  
 Joint sealer  
**EXPANSION**



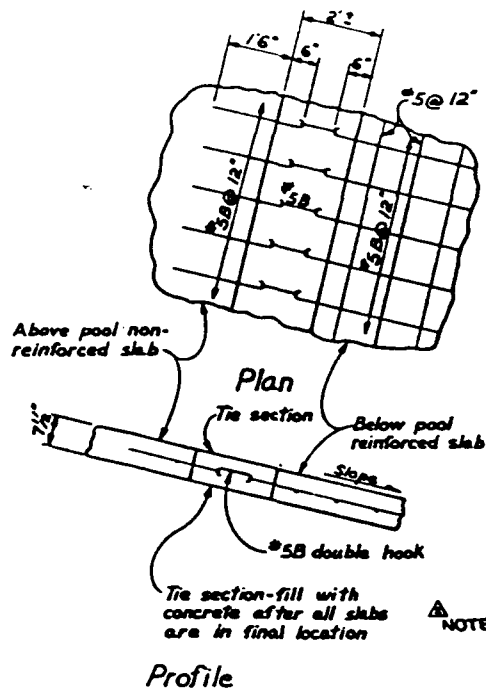


### RAMP & PROFILE

- SUGGESTED SLAB CONSTRUCTION WITH WATER SURFACE
1. PLACE NEW ROCK
  2. CONSTRUCT TEMPORARY
  3. PLACE SANDBAG DEWATERING
  4. PLACE 20 MIL. LUBRICANT
  5. REMOVE DIKE AND
  6. REPLACE REMOVED
  7. PLACE FORMS, CONCRETE
  8. IF NOT INCLUDED IN FINISH, AND CURE TIE
  9. REMOVE TEMPORARY

EXISTING GROUND LINE

## SECTION



1  
9A9A

TIE SECTION DETAIL

**NOTES:**

1. CONSTRUCT 30' WIDE SLOPE EXTENSION. ADDITIONAL FINES MAY BE USED ON SURFACE FOR A SMOOTH, DENSE SURFACE FOR CASTING UNDERWATER CONCRETE SLAB. INCLUDE 10' LEVEL SECTION AT TOP OF SLOPE FOR MANEUVERING PUSH EQUIPMENT.
2. TEMPORARY RAMP SHALL BE REMOVED AFTER USE. MATERIALS MAY BE SPREAD AND PLACED ON PARKING AREA AS DIRECTED BY THE C.O.R.
3. AT CONTRACTORS OPTION, CAST-IN-PLACE SLAB MAY BE CONSTRUCTED WITH SEPARATE THE SECTION AS SHOWN OR THE SECTION MAY BE INCLUDED IN UPPER SLAB SECTION. STEEL CONNECTING TIES ARE REQUIRED WITH EITHER OPTION.

ESTED SLAB CONSTRUCTION SEQUENCE  
WATER SURFACE ABOVE ELEVATION 736

ACE NEW ROCK FILL AND STONE BASE COURSE FOR RAMP SLABS.  
INSTRUCT TEMPORARY STONE RAMP CASTING BED EXTENSION.  
ACE SANBAG DOWATERING DIKE, IF REQUIRED, AND DEWATER.  
ACE 20 MIL LUBRICATED MEMBRANE ERECT FORMS, PLACE  
TEL, POUR, FINISH AND CURE UNDERWATER SLAB.  
!MOVE DIKE AND MOVE UNDERWATER SLAB INTO FINAL LOCATION.  
!PLACE REMOVED SECTION OF DEWATERING DIKE AND DEWATER.  
!WORK BASE AS REQUIRED.  
ACE FORMS, CONNECTING STEEL, POUR FINISH AND CURE  
1ST-IN-PLACE SLAB, INCLUDING, IF CONTRACTOR CHOS, THE TIE SECTION.  
NOT INCLUDED IN 7 ABOVE, FORM, PLACE CONNECTING STEEL, POUR,  
NISH, AND CURE TIE SECTION.  
!MOVE TEMPORARY RAMP AND SANBAG DIKE AND FINISH AREA.

Revisions			
Symbol	Description	Date	Approved
A 1.	REVISED AS CONSTRUCTED. AMD #1-ADDED TO SET	11 Aug 86 [Signature]	[Signature]

Designed by: TAB

Drawn by: TPD

Checked by: DJH

Reworked by: DRR

Approved by:  
COL. CORP. of Engineers

DES MOINES RIVER, IOWA  
RED ROCK DAM - LAKE RED ROCK  
BENNINGTON BOAT RAMP

## BOAT RAMP SECTION AND DETAIL

Scale: NO SCALE

Date: 25 AUG 86

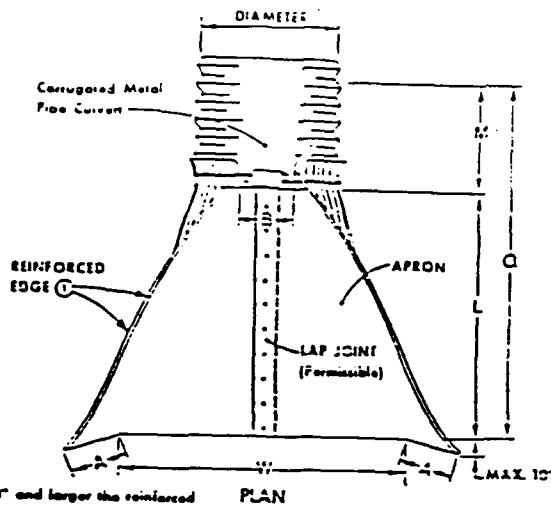
Drawing Code: RR-92

Sheet reference numbers:

C-8A

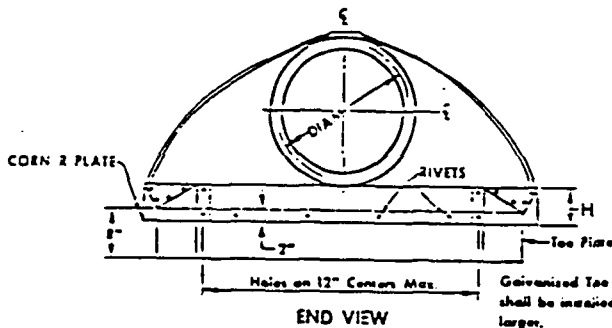
Invitation No. DACW-25-86-0-0075

Sheet \_\_\_ of \_\_\_ 13

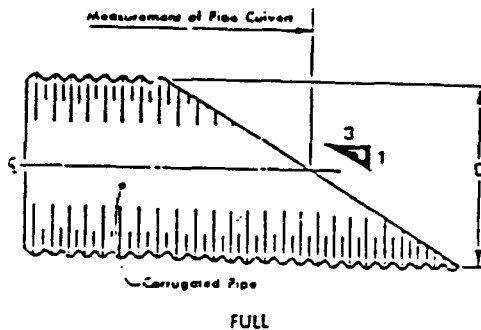
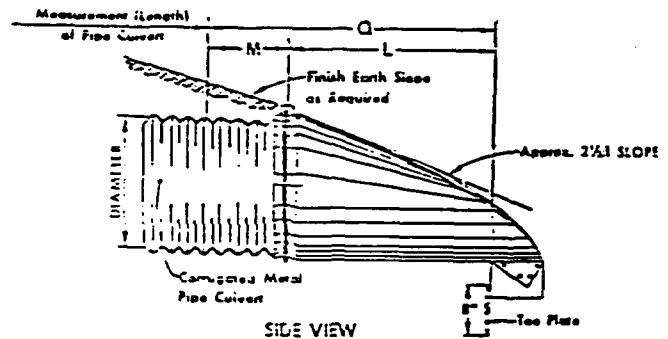


① On sizes 60" and larger the reinforced edge should be supplemented with a galvanized silicon alloy angle attached with bolts.

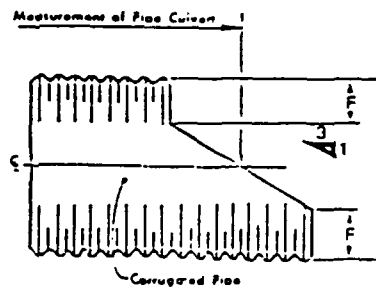
PIPE DIAM.	DIMENSIONS						
	A	B	H	1 1/2"	W	M	O
6"	4 1/2"	1"	3"	8 1/2"	12"	48"	50 1/2"
8"	5 1/2"	2"	4"	10 1/2"	16"	48"	62 1/2"
10"	7 1/2"	3"	6"	12 1/2"	24"	48"	66"
12"	9 1/2"	4"	8"	14 1/2"	32"	48"	69"
15"	12 1/2"	6"	10"	18 1/2"	48"	48"	74"
18"	15 1/2"	8"	12"	21 1/2"	60"	48"	79"
21"	18 1/2"	10"	14"	24 1/2"	72"	48"	84"
24"	21 1/2"	12"	16"	27 1/2"	84"	48"	88"
30"	27 1/2"	15"	20"	33 1/2"	108"	48"	111"
36"	33 1/2"	18"	24"	39 1/2"	126"	48"	121 1/2"
42"	39 1/2"	21"	28"	45 1/2"	144"	48"	123"
48"	45 1/2"	24"	32"	51 1/2"	162"	48"	123"
54"	51 1/2"	27"	36"	57 1/2"	180"	48"	123"
60"	57 1/2"	30"	40"	63 1/2"	198"	48"	123"
66"	63 1/2"	33"	44"	69 1/2"	216"	48"	123"
72"	69 1/2"	36"	48"	75 1/2"	234"	48"	123"
78"	75 1/2"	39"	52"	81 1/2"	252"	48"	123"
84"	81 1/2"	42"	56"	87 1/2"	270"	48"	123"
90"	87 1/2"	45"	60"	93 1/2"	288"	48"	123"
96"	93 1/2"	48"	64"	99 1/2"	306"	48"	123"



Galvanized Toe Plate (Same gage metal as apron) shall be installed on all aprons 24" diameter and larger.



FULL



STEP

BEVELED ENDS FOR CORRUGATED METAL PIPE

BEVEL 3:1	
34"	3"
40"	5"
44"	9"
72"	12"
72"	15"
84"	18"
90"	21"
96"	24"

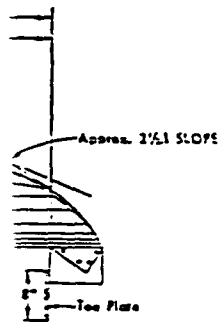
## NOTE:

When specifically required as per plans, ends of pipe culverts provided with beveled ends as a Bevel or Step Bevel may be type is specified. Unless specified slope of the bevel shall be 3:1.

Beveled ends will not be paid when required shall be considered the price bid for the culvert.

## DIMENSIONS

INCH	W	M	O
8"	12"	42"	50 1/2"
14 1/2"	16"	48"	52 1/2"
21"	24"	48"	60"
21"	24"	48"	69"
25"	32"	48"	74"
31"	36"	48"	76"
36"	42"	48"	84"
42"	48"	36"	78"
52 1/2"	60"	24"	76 1/2"
63"	72"	48"	111"
73 1/2"	84"	48"	121 1/2"
84"	90"	36"	120"
84"	102"	36"	120"
87"	114"	36"	123"
87"	120"	36"	123"
87"	126"	36"	123"
87"	132"	36"	123"
87"	138"	36"	123"
87"	144"	36"	123"
87"	150"	36"	123"



## GENERAL NOTES.

Metal pipe aprons and hardware shall be constructed of galvanized steel in conformance with the requirements of current standard specifications for Corrugated Metal Culverts and essentially as indicated herein. Refer to appropriate other standard road plans as well as project plans for additional details of individual culvert installations. Alternate design details may be submitted to the engineer for approval.

Apron may be attached to culvert pipe as follows:

- If normal culvert is of circumferential corrugation type:
  - Use an approved bolt or clamp to fasten apron directly to culvert.
  - If apron is fabricated with "M" dimension of annular corrugated pipe as an integral part of apron, use a standard connecting band to fasten the two pieces together.
- If normal culvert is of helical corrugation type:
  - Use an approved sizing ring securely fastened to inside diameter of apron to connect to the culvert pipe using special dimple band connector.
  - If the apron is fabricated with "M" dimension of annular pipe as an integral part of apron, connect the two with a dimple band.
  - "Dimple" bands shall be approved by the engineer.

Any damage to scuffing Coat resulting from installation of culvert shall be repaired as directed by the engineer.

Price bid for "Metal Aprons" shall be considered full compensation for fabrication and installation of metal aprons as indicated herein.

## \* SPECIAL NOTE:

Corrugated metal pipe of length "M" (See table of Dimensions) shall be furnished and installed in addition to specified length of corrugated metal pipe culvert. This length "M" shall be considered an integral part of the Apron and shall not be measured or paid for as culvert pipe but shall be considered incidental to the item of "Metal Aprons". Dimension "O" shall be considered the "Length" of the apron.

Where the corrugated metal apron is to be used with bituminous coated corrugated metal pipe culverts, the pipe portion (Dimension "M") of this apron shall be bituminous coated, same as the culvert.

31"
3"
5"
9"
12"
15"
18"
21"
24"

## NOTE:

When specifically required as part of detail project plans, ends of pipe culverts may be provided with beveled ends as shown. Either Full Bevel or Step Bevel may be used unless one type is specified. Unless specified otherwise the slope of the bevel shall be 3:1.

Beveled ends will not be paid for separately but when required shall be considered incidental to the price bid for the culvert.

Iowa Department of Transportation Highway Division	
STANDARD ROAD PLAN   RF-5	
RECOMMENDED	APPROVED
METAL PIPE APRONS AND BEVELED ENDS	

## NOTE:

BASIC DRAWING MADE BY THE  
IOWA DEPARTMENT OF TRANSPORTATION,  
HIGHWAY DIVISION.

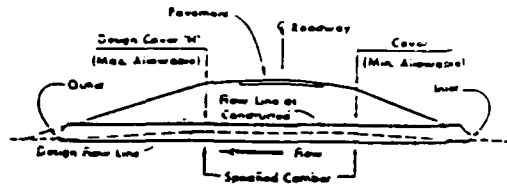
DESIGNED BY TAB		DRAWN BY PLC		CHECKED BY DJH		REVIEWED BY DRR		APPROVED BY WILLIAM S. DUNN CH. COMM. OF ILLINOIS	
DATE 11/15/86		DATE 11/25/86		DATE 11/25/86		DATE 11/25/86		DATE 11/25/86	
PROJECT RED ROCK DAM - LAKE RED ROCK BENNINGTON BOAT RAMP		SHEET C-9		SHEET C-9		SHEET C-9		SHEET C-9	
U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS ROCK ISLAND, ILLINOIS		METAL PIPE APRONS AND BEVELED ENDS		METAL PIPE APRONS AND BEVELED ENDS		METAL PIPE APRONS AND BEVELED ENDS		METAL PIPE APRONS AND BEVELED ENDS	
AS CONSTRUCTED.		NONE		OT August 86		RR-92		INVITATION NO. DCTV 45-86-8-0079	



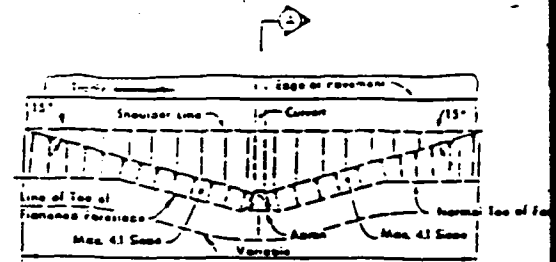
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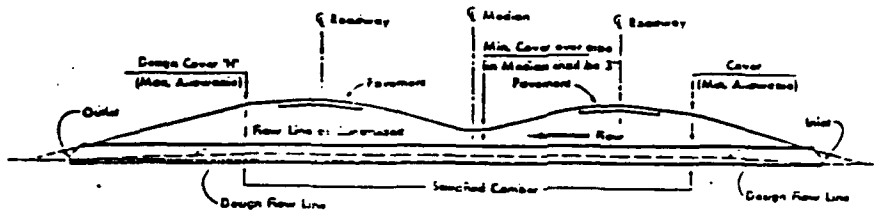
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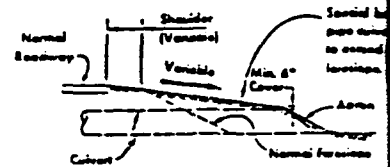
TYPICAL INSTALLATION SINGLE ROADWAY



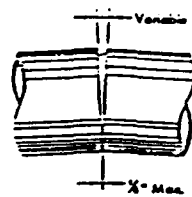
Roadway deck may require  
signment shift adjacent to the culvert.

TYPICAL INSTALLATION PLAN  
WHERE SPECIAL BERM IS REQUIRED

TYPICAL INSTALLATION DUAL ROADWAY



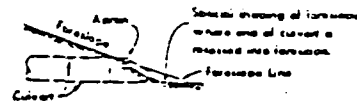
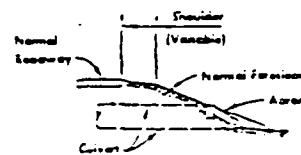
SECTION A-A



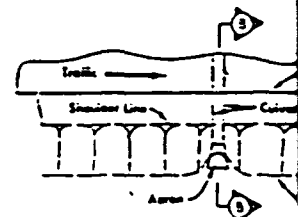
Camber for concrete pipe is accomplished by placing pipe  
tension type at the bottom of the joint with opening at top  
of joint variable, as directed by the engineer.

Camber for corrugated metal pipe shall be accomplished  
as directed by the engineer.

TYPICAL JOINT IN CAMBERED PIPE

DETAIL OF SHAPING EARTH FORESLOPE  
AT CULVERT END

SECTION B-B

TYPICAL INSTALLATION  
WHERE CULVERT MATCHES NORM

## GENERAL NOTES:

Pipe culverts shall be of the kind and classification specified on detail project plans. All materials and methods of construction shall conform to current Standard Specifications. Any construction features not covered by specification shall be as directed by the engineer.

Details shown hereon illustrate certain construction requirements for installation of roadway culverts. Refer to regular listing of culverts and other installation details in project plans and appropriate other Standard Road Plans for additional requirements.

## COVER:

Minimum and maximum allowable cover for pipe culverts shall be as shown on the appropriate Standard Road Plans for the particular kind of culvert, as follows:

RF-31, Depth of Cover Tables for Concrete Pipe.

RF-22, 33, Depth of Cover Tables for Corrugated Metal Pipe.

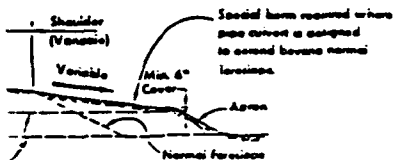
## CAMBER:

Camber is the dimension above a straight line between inlet and outlet elevation. Some settlement of the structure is usually anticipated, resulting in the design flow line between inlet and outlet. Camber is developed uniformly from inlet and outlet to a point beneath the outside shoulder lines of the roadway and is uniform between those points, as indicated hereon.

Normal construction procedure shall be to install pipe culverts with "normal" camber as indicated hereon. Where so specified on project plans, camber exceeding the normal may be used where yielding soil conditions require the provision of more than normal camber.



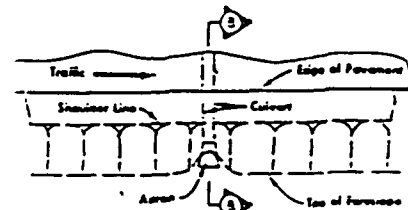
SECTION PLAN  
FORM IS REQUIRED



SECTION A-A

## ALLOWABLE CAMBER TABLES

Culvert Cover: Normal	Camber	Feet	M.S.L.
4'	4'11"	5'	5'11"
5	0.24	24"	1
10	0.17	32"	1.2
15	0.23	36"	1.3
20	0.33	42"	1.4
25	0.42	48"	1.5
30	0.50	60"	1.6
35	0.58	84"	1.7

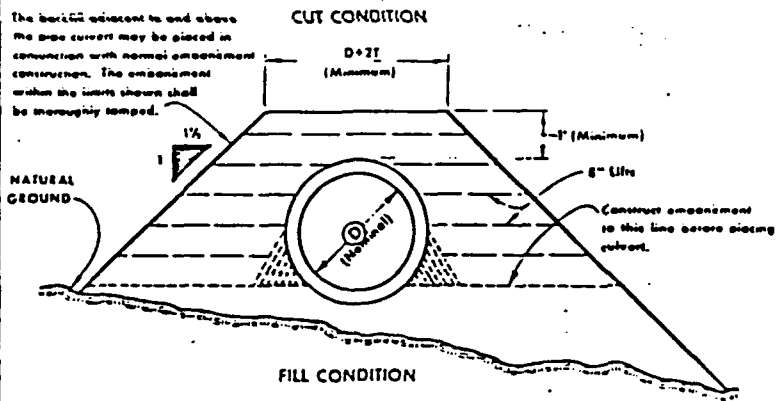
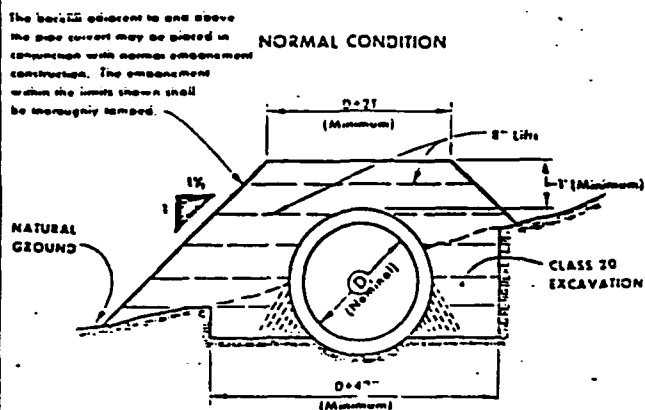
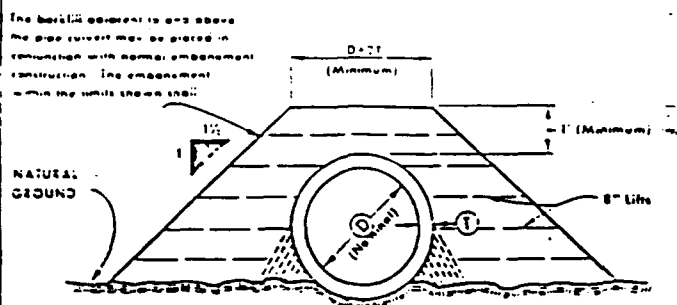


TYPICAL INSTALLATION PLAN  
WHERE CULVERT MATCHES NORMAL FORESLOPE

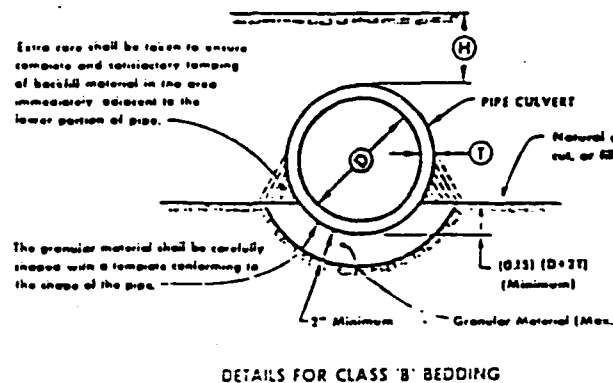
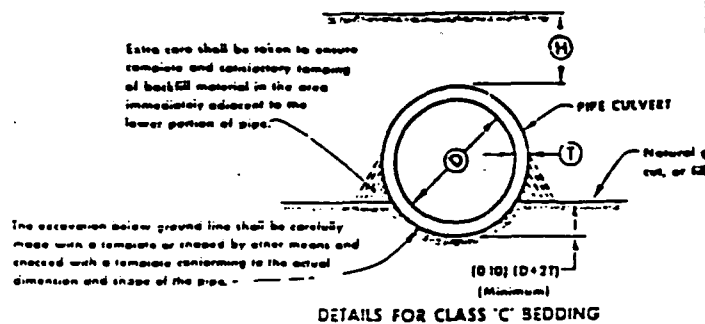
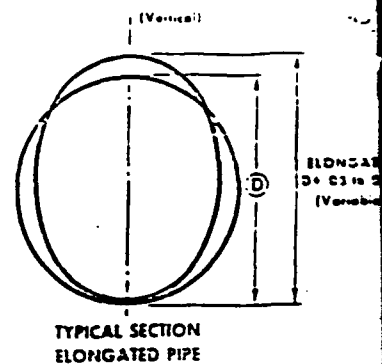
		<b>Highway Division</b>	
<b>STANDARD ROAD PLAN</b>		<b>RF-308</b>	
DESIGNED BY	DATE	RECOMMENDED BY	DATE
CHECKED BY	DATE	APPROVED BY	DATE
<b>PIPE CULVERT INSTALLATION DETAILS (COVER AND CAMBER)</b>			

NOTE:  
BASIC DRAWING MADE BY THE  
IOWA DEPARTMENT OF TRANSPORTATION,  
HIGHWAY DIVISION.

<b>DES MOINES RIVER, IOWA RED ROCK DAM - LAKE RED ROCK BENNINGTON BOAT RAMP</b>			
<b>PIPE CULVERT INSTALLATION DETAILS (COVER AND CAMBER)</b>	<b>Scale</b> NONE <b>Date</b> 07 August 86 <b>Drawing Code</b> RR-32	<b>Sheet reference number</b> <b>C-10</b>	<b>INVITATION NO.</b> <b>RRW 85-06-00075</b> Sheet 11 of 11



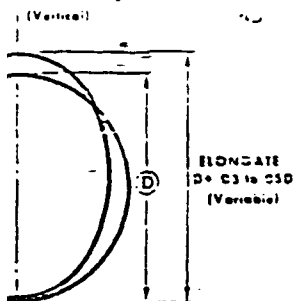
TYPICAL DETAILS FOR  
BACKFILLING OF ROADWAY PIPE CULVERTS



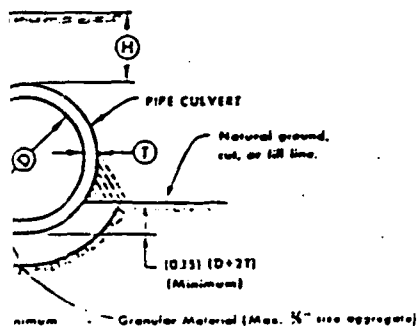
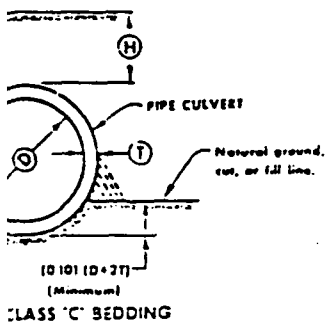
3

2

1



SECTION  
ATED PIPE



CLASS 'B' BEDDING

#### GENERAL NOTES

Pipe culverts shall be of the end and construction specified on detail project plans. All materials and methods of construction shall conform to current standards specified and any construction required, not covered by specifications shall be at the discretion of the engineer.

Where a corrugated metal pipe culvert requiring elongation is to be installed, such elongation is to be determined as means specified by the engineer. Elongation may be developed either at bottom of pipe (location of field installation) unless specified otherwise by the engineer. Other series of installation for elongated pipe shall be the same as for round pipe unless otherwise specified by the engineer.

The minimum and maximum allowable cover for pipe culverts shall be as shown on the appropriate Standard Road Plans for the particular kind of culvert, as follows:

- RF-31 Depth of Cover Tables for Concrete Pipe Culverts
- RF-32 Depth of Cover Tables for Corrugated Metal Pipe Culverts (7.2.3)
- RF-33 Depth of Cover Tables for Corrugated Metal Pipe Culverts (4.5.6.7)

		<b>Highway Division</b>	
		STANDARD ROAD PLAN	RF-30A
DESIGNED BY	DATE	REVISIONS	
RECOMMENDED	DATE	REVISIONS	
APPROVED	DATE	REVISIONS	
PIPE CULVERT INSTALLATION DETAILS (BEDDING AND BACKFILL)			

#### NOTE:

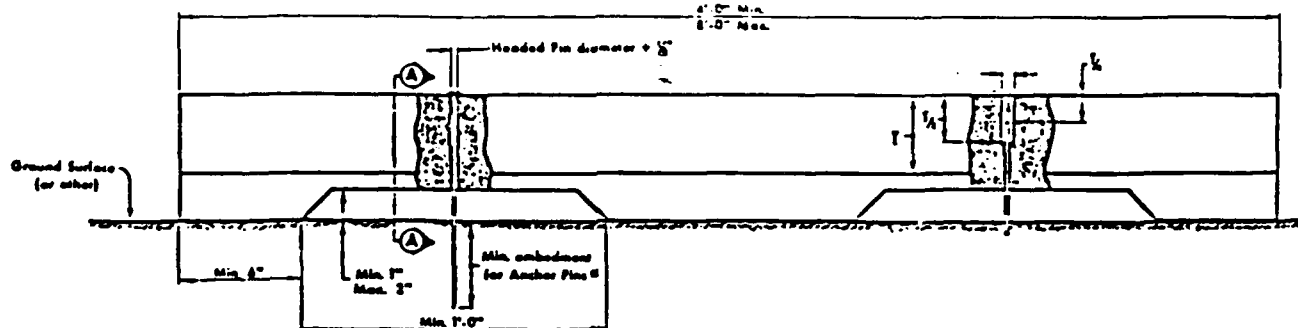
BASIC DRAWING MADE BY THE  
IOWA DEPARTMENT OF TRANSPORTATION,  
HIGHWAY DIVISION.

DESIGNED BY <b>TAB</b>		U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS ROCK ISLAND, ILLINOIS	
DRAWN BY <b>PLC</b>		<b>PIPE CULVERT INSTALLATION DETAILS (BEDDING AND BACKFILL)</b>	
CHECKED BY <b>DJH</b>		SCALE <b>NONE</b>	
REVIEWED BY <b>DRR</b>		DATE <b>07 August 86</b>	
APPROVED BY <b>WILLIAM C. DUNN</b> CHIEF, OFFICE OF ENGINEERING		DRAWING NO. <b>RR-92</b>	
SHEET NO. <b>C-11</b>		INVIATION NO. <b>DS-01-0-0075</b>	

3

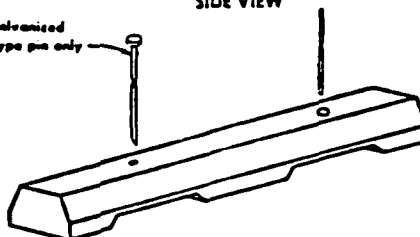
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1



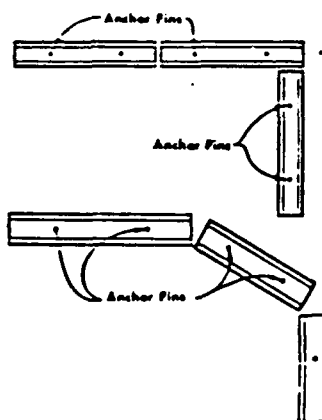
Top 6" Galvanized  
headed type pin only

SIDE VIEW

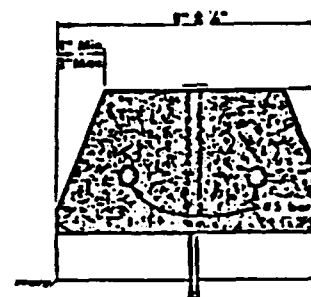


ISOMETRIC VIEW

Either Headed or Non Headed type Anchor Pin may be used.



TYPICAL INSTALLATION PLAN  
(PRECAST CONCRETE CURBS)



NOTE:  
The Type 3 Precast Concrete Curb should be  
used where normal type of service is noted

[illegible]